2009

Sex Differences in Symptom Presentation of Schizotypal Personality Disorder in First-Degree Family Members of Individuals with Schizophrenia

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SEX DIFFERENCES IN SYMPTOM PRESENTATION OF SCHIZOTYPAL PERSONALITY DISORDER IN FIRST-DEGREE FAMILY MEMBERS OF INDIVIDUALS WITH SCHIZOPHRENIA

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Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

July 2009

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE

DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Alexandra Duncan-Ramos on the 23rd day of July, 2009 in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Acknowledgments

First and foremost I must give glory and honor to my Lord and Savior, Jesus Christ. For without His presence in my life, I believe my path and career choice would have been very different and successful completion of my graduate training impossible. Second, I would like to thank my husband for his love, support, and unending encouragement. His understanding and unselfish sacrifices enabled me to focus freely on my course work and training requirements. I love you very much, honey. I would also like to thank my family, including my mom, dad, father and two sisters for their continued love, patience, and understanding, as well as for graciously scheduling family time around my busy schedule to allow me to learn and grow personally and professionally. Thank you! To Dr. Raquel Gur and Dr. Monica Calkins, thank you for allowing me the opportunity to fully experience the research process from start to finish. My time with the Brain Behavior Laboratory reaffirmed my servant's approach to working in mental healthcare. I would also like to acknowledge Dr. Calkins' generosity in making time within her busy day to kindly spend hours with me, analyzing and helping me to understand my data. And last, I would like to thank each and every faculty member at the Philadelphia College of Osteopathic Medicine from whom I have had the privilege of learning during my years as a student. I specifically want to thank Dr. Barbara Golden for her continued support and encouragement, as well as her guidance throughout my training. Your kindness and patience made the dissertation process, which at times seemed insurmountable, very manageable and reasonable. Thank you!

Abstract

Schizophrenia (SCZ) is a devastating illness, with clinical symptoms generally characterized as positive or negative. The reach of SCZ is broad, significantly impacting economic, social and familial facets of life. Current literature suggested optimal treatment for individuals with SCZ must include medication management and family psychological interventions to achieve patient stabilization. Literature has identified a likely familial and genetic link between individuals with SCZ and schizotypal personality disorder (STPD) in first-degree family members (FDFM), and has proposed a similar sex distinction with regard to symptomatology in STPD often noted in SCZ. The results of this investigation yielded clinically significant information; however, none of the study hypotheses was supported. Sex differences were not observed between relatives, compared with healthy comparison participants: male parents compared with female parents, and siblings compared with comparison subjects. A noteworthy finding was that relatives, including siblings, were found to endorse more symptoms significantly consistent with STPD when compared with healthy comparison subjects in all analyses. Implications for training and treatment were discussed. Limitations of the study and directions for future research were also addressed.

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I have set the Lord always before me. Because He is at my right hand, I will not be shaken. Therefore my heart is glad and my tongue rejoices; my body also will rest secure …

Psalm 16:8-9

Chapter One: Statement of the Problem

Overview of the Problem

Schizophrenia is a devastating mental illness that drastically impacts the lives of those affected, as well as their families and society. Some individuals display exacerbations and remissions of symptoms, whereas others remain chronically ill throughout their life spans (APA, 2000). In general, the symptoms of schizophrenia (SCZ) can be classified either as positive or as negative. Positive symptomatology tends to be characterized by a distortion in normal functioning, which may include the experience of delusions and hallucinations, as well as disorganized behavior and speech (APA, 2000). Negative symptomatology on the other hand is generally characterized by an attenuation or loss of normal functioning, including restrictions in emotional expression, fluency and productivity of thought and speech and initiation of goal-directed behavior (APA, 2000).

The devastation of SCZ directly impacts the economic, social and familial facets of life. The negative attitudes of relatives directed toward a family member with SCZ are among the most powerful predictors of relapse (Kavanagh, 1992), resulting in increased economic burden for the family and society (Rice, 1999; Lindstrom, Eberhard, Neovius, & Levender, 2007; Weiden & Olfson, 1995). The current trend in literature suggests that optimal treatment for individuals with SCZ includes not only medication management for stabilization, but also family psychological interventions. In light of literature that has identified a familial and genetic link between individuals with SCZ and an increased risk for schizotypal personality disorder (STPD) in first-degree family members (FDFM), this

may be particularly salient for family treatment (Baron et al., 1985; Kendler & Gruenberg, 1984; Kendler, Masterson, Ungaro, & Davis, 1984). As a result, research is needed to clarify the nature of STPD diagnostic features because FDFM with a diagnosis of STPD or features of the disorder are likely to interact with the mental health community.

Although persons with STPD are unlikely to self-initiate mental health treatment (APA, 2000), they will, perhaps, be encouraged to enter family treatment for the sake of a family member with SCZ (Cuijpers, 1999; Dixon, 1999; Pitschel-Walz, Leucht, Bauml, Kissling, & Engel, 2001). Such clarifications may be beneficial for the mental health community who may engage SCZ family members in treatment, because further insight into the STPD disorder may aid in the development of helpful strategies, devised to reach out to FDFM and to inform subsequent individualized treatment strategies and plans. All of these will likely aid in the stabilization of the individual with SCZ, thereby reducing the societal economic burden and increasing positive social and familial experiences (Falloon, Held, Coverdale, Roncone, & Laidlaw, 1999; Gruber, Kajevic, Bjedov, & Agius, 2005).

Purpose of the Study

The purpose of this investigation was to clarify the symptom presentation of STPD, because such clarification may ultimately aid in the stabilization of family members with SCZ. More specifically, literature has asserted that males diagnosed with schizophrenia tend to possess more negative symptoms, such as flat affect, avolition and social withdrawal (Lewine, 1985), whereas female counterparts tend to express more

positive symptoms, such as paranoid delusions and hallucinations (APA, 2000). This distinction in the expression of disorder is likely to impact the course and nature of treatment interventions such as medication or individual therapy. As STPD in FDFM of persons with schizophrenia is likely genetically related, it was hypothesized that a similar sex distinction in symptom presentation would have been observed in family members through means of a semi-structured interview, because this distinction was noted in studies in which self-report inventories were used (Miller, & Burns, 1995; Raine, 1992; Roth, & Baribeau, 1997).

Relevance to Psychological Treatment

Although little research has specifically examined efficacious treatment strategies for individuals with STPD, research has indicated that individuals with SCZ benefit when their FDFM engage in family therapy (Cuijpers, 1999; Dixon, 1999; Pitschel-Walz et al., 2001), which likely includes a family member with a diagnosis or features of STPD. Individual and group formats of family therapy for FDFM of an individual with SCZ have been well studied. Recent research has clearly demonstrated that the use of Cognitive Behavioral Therapy with clients living with schizophrenia is an efficacious treatment modality, producing lasting positive outcomes (Butler, Chapman, Forman, & Beck, 2005). Presently, there is little research that has examined treatment approaches for schizotypal personality disorder. However, preliminary research has suggested that Cognitive Behavioral Therapy would benefit individuals suffering from cluster A personality disorders, which encompasses STPD (Ball, Kearney, Wilhelm, Dewhurst-Savellis, & Barton, 2000; Beck, Freeman, & Associates, 2004). Therefore, efficacious

treatment strategies and plans that incorporate STPD symptom feature clarification, such as sex differences, were recommended areas future investigations.

Chapter Two: Literature Review

Schizophrenia (SCZ) is devastating mental illness affecting approximately 0.5% to 1.5% of the general adult population at some point during the course of their lifetimes (APA, 2000; Warner & Girolamo, 1995). The course of the illness may be variable; some individuals may display exacerbations and remissions, yet others remain chronically ill (APA, 2000). The symptoms of schizophrenia (SCZ) generally can be characterized as falling into two broad categories: positive and negative. The positive symptoms reflect an excess or distortion of normal functioning, but the negative symptoms reflect an attenuation or loss of normal functioning (APA, 2000). The positive symptom dimension includes two components: the psychotic dimension, which is composed of delusions and hallucinations, and the disorganization dimension, which includes disorganized behavior and speech (APA, 2000). The negative dimension tends to include restrictions in the range and intensity of emotional expression, a restriction in the fluency and productivity of thought and speech, and a restriction in the initiation of goal-directed behavior (APA, 2000).

As cited by Weisman (1997), strong evidence suggests that the prognosis for individuals living with SCZ in developing countries is superior to those living in industrialized countries. Weisman cited data from the World Health Organization's International Pilot Study of Schizophrenia (1979), which found that those with SCZ residing in the developing countries of Nigeria, India and Colombia demonstrated fewer symptoms and better functioning between episodes than those living in the industrialized nations of Denmark, the United Kingdom, and the United States (Weisman, 1997).

Furthermore, in both the 2-year and 5-year follow-up studies, the original findings were upheld. This striking difference led researchers to hypothesize that cultural factors may impact the manifestation and outcome of psychotic disorders. Weisman (1997) proposed that society's beliefs about schizophrenia influence its reactions toward mentally ill individuals. Therefore, society's response is believed to be a key factor in accounting for the differences in lifespan illness prognosis. Weisman (1997) hypothesized that attributions regarding the cause and controllability of psychosis are important in determining how members of the society respond to those who are mentally ill. Furthermore, Weisman proposed that a society's value systems and customs, including religion and kinship structure, are thought to guide and shape the conceptualizations of mental illness, resulting in the minimization of stress, social stigma, and self-devaluation in some countries (Weisman, 1997). The devastating impact of SCZ can be observed by examining its economic, social and familial burdens on society.

Impact of Schizophrenia

Economic Impact

The early onset and chronic nature of SCZ will result in significant, cumulative direct costs that stem from medication, hospitalization, and sheltered living, as well as indirect costs from low productivity. Lindstrom et al. (2007) found that direct costs were attributed solely to sheltered living and hospitalizations, whereas drug costs consisted of only 4% of the total measurable costs. Studies examining the specific cost of mental illness in developed countries found the cost to be estimated between 1.5% and 3% of the national health expenditures; 22% of the costs of mental illness are directly related to

schizophrenia (Rice, 1999). Schizophrenia is estimated to be one of the most costly psychiatric illnesses, affecting about 1% of the population, but consuming 2.5% of the total healthcare budget in the United States (Lindstrom et al., 2007). A majority of the direct health costs related to schizophrenia are related to hospitalizations for both initial episodes and for relapses (Weiden & Olfson, 1995). Approximately half of the relapses are associated with poor compliance with drug therapy; the remaining relapses are associated with treatment issues (Weiden & Olfson, 1995).

In the decade of the nineteen-nineties, patients diagnosed with SCZ occupied 25% of all hospital beds and constituted 10% of the permanently disabled in the United States (Genduso & Haley, 1997). Investigators reviewed several published studies that reported overall hospitalization costs, and found that the estimated range of the cost of relapse is between $10,000 and $26,000 per episode (Thieda, Beard, Richter, & Kane, 2003). Therefore, the inpatient cost of relapse ranged between $9,000 and $16,000 per incident (Thieda et al., 2003). A further examination of the cost of relapse indicated that hospitalizations represent approximately 85% to 95% of the actual relapse cost, with the remainder of the costs attributed to increased drug dosages, additional clinic follow-ups over the subsequent year and general case management (Glazer & Ereshefshy, 1996). This striking data suggests that the high hospitalization costs related to relapses places significant clinical and economic burden on the patient and health care providers (Thieda et al., 2003).

The primary effect of treatment noncompliance results in increased relapse rates (Thieda, et al., 2003). The estimated cost of noncompliance with a prescribed medication

regimen is estimated to be approximately $705 million over two years (Thieda et al., 2003). A study specifically examining an aspect of medication noncompliance was conducted, examining claims data for patient hospitalizations. Pharmacy records of 619 patients with SCZ were examined, based on 12-month period of pharmacy records, showing whether or not patients picked-up their medications. The results demonstrated the fact that 31% of the patients were found to have irregular use of their medications (Svarstad, Shireman & Sweeney, 2001).

Despite the lack of precision in the estimate of compliance, the use of hospital services were greater for the patients with irregular medication use than for those who picked-up their medications regularly (Svarstad et al., 2001). An estimated 33% of irregular users were re-hospitalized for SCZ during the year as compared with only 18% of those who received their medications regularly (Svarstad et al., 2001). Furthermore, the average cost of hospital expenditures per patient with SCZ for irregular and regular medication users was about $3,500 and $1,800, respectively. Thieda et al. (2003), therefore, suggest that additional support services such as family therapy, community-based services and assistance with compliance strategies may significantly improve patient outcome. These figures demonstrate the striking economic impact of SCZ, but the devastating reach of SCZ is not limited to healthcare costs alone. The indirect costs of SCZ impact both social and familial functioning and stability.

Social Impact

It is estimated that approximately 60% to 70% of individuals with SCZ do not marry and most have relatively limited social contact (APA, 2000). Lindstrom et al.

(2007) followed individuals with schizophrenia over a 5-year period, finding that between 15% and 26% of patients were completely without social contacts, and a substantial remainder of patients had social contact only with healthcare staff. Additionally, a large portion of patients lacked meaningful daily activities (Lindstrom et al., 2007). Although social withdrawal is considered to be a diagnostic feature of SCZ (APA, 2000), some researchers have suggested that social stigma may play a significant role in the social isolation of patients with SCZ and of their family members.

Mental illness has been interpreted differently throughout history depending on culture specific beliefs. In social settings, mental illness has almost always had a negative connotation, resulting in a multitude of discriminations (Gonzales-Torres, Oraa, Aristegui, Fernandez-Rivas, & Guimon, 2007). Certain expressions, such as "mentally ill" or "mental patients" are still commonly associated with violence, danger, and unpredictability, as reviewed by Gonzales-Torres et al. (2007). When compared with other mental illnesses, SCZ has been linked with negative media coverage and public image (Schulze, Richter-Werling, Matschinger, & Angermeyer, 2003). These public fears and negative stereotypes pose obstacles for individuals in obtaining adequate and effective treatment, as well as in social integration (Schulze & Angermeyer, 2003). Therefore, it has been proposed that patients with SCZ, as a group, are the most likely of all mentally ill patients to suffer from stigma, suggesting that the effects of discrimination work as a "second illness" not only to impact interpersonal relationships negatively, but also, more broadly, to impact social roles and interactions negatively (Gonzales-Torres et al., 2007). As a result, such experiences present important barriers to the patient's

clinical improvement and mental wellbeing through restricting opportunities and diminishing self-esteem (Gonzales-Torres et al., 2007).

A recent investigation examined stigma and discrimination experienced in a community in Northern Spain and found that SCZ patients tend to isolate themselves in an attempt to protect themselves, as has been proposed by the authors (Gonzales-Torres et al., 2007). Patient isolation and concealment of illness has been well researched (Dickerson, Sommerville, Origoni, Ringel, & Parente, 2002; Gonzales-Torres et al., 2007; Pinfold, Byrne, & Toulmin, 2006; Wahl, 1999). The results of Gonzales-Torres et al. (2007) demonstrate that patients tend to assume the role of the negative stereotype, resulting in self-discrimination and isolation from the social world. Similarly, investigators proposed that the social distance created by society towards people with SCZ further compounds patient isolation (Gonzales-Torres et al., 2007). Last, their findings indicated that relatives also experienced stigma and discrimination in all areas of life, resulting in isolation and avoidance. Therefore, Gonzales-Torres et al. (2007) believed that stigma experienced by individuals with SCZ and by their families are strongly impacted by the historical, social, educational, and cultural characteristics of the group to which they belong, suggesting that it might be difficult to generalize findings from one country or specific group to another. Although findings may be difficult to generalize, mental illness often greatly impacts family life.

Familial Impact

The illness of schizophrenia also greatly affects families and relatives who often provide much of the needed informal care giving. One study estimated that family

members spent an estimated 67 hours a month providing informal care (Genduso & Haley, 1997). In a literature review conducted by Genduso and Haley (1997), the investigators reported that parents frequently took sick leave to care for their children. In addition, parents became socially isolated from friends and often developed their own psychological problems (Genduso & Haley, 1997).

Attributional model of emotion. Attributional approaches have been applied in the assessment of helping behaviors, based on the assumption that an individual's decision to help another in person in need of aid is determined in part by the perceived cause of the other person's need, as cited by Weiner (1980a, b). The most well defined model is the Attributional Model of Emotions, proposed by Weiner (1980a, b). Weiner purported that if the cause of a person's need is perceived to be within that individual's control or if the person is believed to be responsible for his or her need, aid is apt to be withheld by others. However, if the need is perceived to be caused by an uncontrollable event or that the person is believed not to be responsible, aid is offered. Weiner (1980a, b) asserted that an individual's belief regarding the controllability of the cause of the need is not influenced by a decision to help, but is influenced and mediated by the affective reactions of sympathy, pity or anger.

More specifically, Weiner (1980a, b) suggested that when individuals are presented with an unpleasant event or behavior of another person, individuals tend to evaluate that person's ability to have controlled or have prevented the occurrence. When controllable factors are believed to have been present, people are likely to respond to the person with negative emotions such as anger and dislike, resulting in patient antisocial

responses (Weiner, 1980a, b). When the same event or behavior is perceived to be outside the individual's personal control, people tend to respond with emotions such as sympathy, pity or prosocial behavior (Weiner, 1980a, b). Therefore, Weiner (1980a, b) hypothesized that emotional reactions influence an individual's likelihood to help. Stated simply, the more one is likely to help, the more sympathy and less anger that an individual feels (Reisenzein, 1986; Weiner, 1980a,b).

Reisenzein (1986) proposed that Weiner's model can be grouped into three categories based on empirical evidence: evidence supporting the link between helping and perceived controllability; research supporting the link between controllability and affective reactions of sympathy/pity and anger, and lastly, data supporting the connection between affects and helping. Evidence in support of the controllability-help link has its cause in studies in which participants were provided with information about the cause of another person's need, and the tendency and/or the amount of help given (Barnes, Ickes, & Kidd, 1979; Meyer & Mulherin, 1980; Weiner, 1980a). Researchers have found that a need perceived to be due to uncontrollable causes leads to significantly more help than does a need perceived to be controllable by the possible recipient of help (Barnes et al., 1979; Meyer & Mulherin, 1980; Reisenzein, 1986; Weiner, 1980a).

With regard to the controllability-affect link, researchers demonstrated that if a person's need is attributed to causes beyond his or her control, then sympathy is subsequently elicited (Meyer & Mulherin, 1980; Weiner, 1980a). However, if the need is attributed to causes viewed as controllable, then anger tends to be the dominant emotional reaction (Meyer & Mulherin, 1980; Weiner, 1980a). Therefore, evidence that

controllability rather than locus or stability is the main causal factor linked with sympathy and anger (Meyer & Mulherin, 1980; Weiner, Graham, & Chandler, 1982).

Lastly, the affect-help link has been demonstrated by studies examining general affective reactions in helping situations, in which the situations have been manipulated via misattribution of arousal techniques or a false physiological feedback method (Batson, Duncan, Ackerman, Buckley, & Birch, 1981; Coke, Batson, & McDavis, 1978). These studies demonstrated that participants who were provided the opportunity to misattribute their emotional reactions experienced in a helping situation to a non-emotional source showed considerably less willingness to help as compared with those who were not provided the misattributional opportunity (Batson et al., 1981; Coke et al., 1978). Those participants who received false physiological feedback suggesting high arousal demonstrated significantly more willingness to help than those participants in the control group (Coke et al., 1978).

Expressed emotion in families. Researchers attempted to apply Weiner's model to the study of psychopathology, using a construct termed expressed emotion (EE) (Jenkins & Karno, 1992). Expressed emotion is a measure of attitudes that a close relative possesses toward a mentally ill family member. Specifically, EE measures critical and hostile comments, and evidence of emotional over-involvement, such as exaggerated affect and overly self-sacrificing behaviors (Jenkins & Karno, 1992).

In a literature review conducted by Weisman (1997), studies conducted over the past several decades have found that individuals with SCZ, who return from the hospital to live with those relatives who talk about the patient in a critical, hostile or emotionally

over-involved manner (termed high-EE), suffer from increased relapse rates when compared with individuals whose relatives do not express these negative attitudes (termed as low-EE). Hooley (1987) hypothesized that high-EE attitudes, defined as critical comments, can develop when a relative perceives that the symptoms are not the result of a legitimate illness, and to some degree are within the control of the ill individual. Hooley (1987) proposed that relatives with high-EE are inclined to nag and criticize the ill family member in an attempt to change the undesirable behaviors. Therefore, the ill family member who is often criticized may be subjected to higher levels of stress, contributing to increased relapse (Hooley, 1987).

Hooley (1987) proposed that relatives with low-EE tend to make attributions about the illness in a manner consistent with the medical model. He hypothesized that low-EE relatives do not hold the mentally ill family member responsible for his or her bizarre behavior, because it is perceived to be a side effect of a genuine illness (Hooley, 1987). These relatives are believed to respond to schizophrenia symptomatology with patience and understanding. Therefore, more positive reactions by relatives are thought to be associated with greater stability and a healthier environment, corresponding with less stress (Hooley, 1987).

Severe mental illness is a significant family concern because family members with severe mental illness frequently live at home rather than in institutions (Chesla, 1989). Families often serve as an extension of the mental health system (Marsh, 1992) by providing case management functions such as assessment, monitoring, assistance with daily problems, crisis intervention and advocacy (Intagliata, Willer, & Egri, 1986). The

negative attitudes of relatives towards patients are one of the most powerful predictors of clinical relapse in SCZ (Kavanagh, 1992).

Role of family stress. Some investigations examined family-rearing stress on SCZ outcome. These studies specifically examined rearing stress in vulnerable children, most often labeled as "high risk" because of a parent with schizophrenia. A sample of 265 Danish children was examined extensively by Mednick, Mura, Schulsinger, and Mednick in 1971. All children with one parent having a psychiatric registry diagnosis of SCZ composed the high-risk group. Measures of family environment were collected by social workers when the children reached 11 years old. The families of high-risk participants, who later decompensated and developed SCZ, reported more stressful family characteristics in childhood than did the families of the participants who did not develop SCZ (Mednick et al., 1971). Results from another longitudinal study involving high-risk participants also suggested an association between poor parenting and later development of schizophrenia in children whose parents had SCZ. The findings of the National Institute of Health Israeli Kibbutz-City Study demonstrated an association between inconsistent parenting, over involvement, and hostility toward children and later schizophrenia-spectrum decompensation in children who had a parent with SCZ (Marcus et al., 1987).

In an adoption study by Tienari (1991), results indicated that poor family relationships contributed to the risk of schizophrenia offspring in parents with SCZ. High-risk offspring were more likely to develop psychopathology when placed in a disturbed adoptive family than when placed in healthy adoptive family (Tienari, 1991).

This finding supported the hypothesis that a positive family-rearing environment can protect genetically vulnerable children from developing a future psychosis (Tienari, 1991).

These identified findings suggested that the likelihood of developing SCZ is increased by an interaction between early childhood stress and a genetic liability to schizophrenia. Schiffman et al. (2001) proposed a two-hit theory to explain this interaction, suggesting that two events, or "hits", are associated with an increased risk for SCZ. The first hit stems from a genetic liability for SCZ. The second hit stems from environmental stressors, including high levels of family stress. The investigators proposed intervention strategies at two different time points (Shiffman et al., 2001). First, they suggested that early assessment procedures may reveal the occurrence of a first hit that can put a child at risk for schizophrenia, and then later interventions targeting the attenuation of the second hit can be appropriately implemented for those identified as having a first hit, potentially preventing the development of SCZ in vulnerable children (Schiffman et al., 2001)

Burman, Mednick, Machon, Parnas, and Schulsinger (1987) found that high-risk families reported poorer family relationships than low-risk families. Families with children who later developed SCZ perceived both mother and father relationships as being worse than families with children who later developed schizotypal personality disorder (Burman et al., 1987). Scott, Fagin, and Winter (1993) observed worse long-term outcomes for SCZ patients with poor perceptions of family relationships as compared with SCZ individuals with more positive perceptions of family relationships.

Lastly, evidence suggested that high levels of critical attitudes in the family predict the onset of schizophrenia-spectrum disorders in adolescents (Valone, Norton, Goldstein, & Doane, 1983).

An investigation by Rosenfarb, Bellack, Aziz, Kratz and Sayers (2004), examined family interactions associated with failure to stabilize an individual with SCZ. Fifty-eight patients with SCZ and a parent for each patient who participated in the NIMH Collaborative Study on Treatment Strategies in Schizophrenia were included. The results suggested that family interactional behaviors that are associated with patient stabilization in SCZ differ in African American patients than in Caucasian patients (Rosenfarb et al., 2004). The findings indicated that for African American patients, parent critical and intrusive behaviors failed to predict the course of the disorder. These findings appeared consistent with prior research indicating that family-expressed emotion does not predict relapse in African American patients (Rosenfarb et al., 2004). Therefore, Rosenfarb et al. (2004) proposed the modification of traditional measures of the family's stress in an attempt to better understand the association between African American relatives' attitudes, behavior toward patients and the course of SCZ (Rosenfarb et al., 2004).

In a study conducted with a Mexican American sample, Weisman, Lopez, Karno and Jenkins (1993) found that attributions held by relatives were related to their affective reactions. Relatives who perceived the ill family member as having control over his or her symptoms of SCZ tended to express more negative emotions such as anger and annoyance toward the ill individual than did relatives who viewed the symptoms as being beyond the patient's personal control (Weisman et al., 1993). Jenkins, Karno, de la Selva

and Santana (1986) examined familial expressed emotions to SCZ among a Mexican American sample. The results demonstrated a marked difference in the percentages of high-EE families between Mexican American and Anglo American relatives in a matched sample. For Mexican American relatives, 69% were rated as low-EE but only 33.8% of the Anglo American relatives were rated as low-EE (Jenkins et al., 1986). Both sets of results suggest that the attributional model may have cultural implications for understanding the construct of expressed emotion (Jenkins et al., 1986; Weisman et al., 1993).

Cultural influence. A common philosophical orientation among Latino groups and folk healers is the concept of fatalism. This stance presupposes the existence of supernatural and external forces that unpredictably interfere in human affairs (Sandoval & de la Rosa, 1986). Catholicism, fatalism and folk teachings seem to encourage resignation and passivity, as well as to provide a sense of security, acceptance, and comfort for the patient and family (Sandoval & de la Rosa, 1986). It was proposed that folk healing prevents labeling patients as crazy, because a spiritualist session creates a permissive group setting in which all abnormal behavior is accepted and is given meaning (Gomez, 1982). For instance, when hallucinations or other unusual behaviors are ascribed to religious beliefs and to the supernatural, the family impact lessens as behaviors are interpreted as a more normal and noble expression of distress (Torrey, 1970).

In the Latino community, folk healers and Catholic clergy encourage Latinos to believe that another's suffering is symbolically their own (Kiev, 1968). Also, the

acceptance of things one cannot control, a tenet of fatalism, permits families to psychologically and culturally prepare for uncertainties of life (Kiev, 1968). Such a belief system supports the belief that no protection exists against adversity; therefore, anything that can happen to others can also happen to oneself (Jenkins et al., 1986). This cultural perspective of external locus of control is believed to allow Latinos to be more compassionate and tolerant of others' failures, including mental illness (Jenkins et al., 1986). This orientation may be one of the contributing factors that accounts for the low levels of anger and hostility elicited by Mexican American families of an individual with schizophrenia (Jenkins et al., 1986).

Similarly, beliefs about supernatural forces have important implications for the attribution of responsibility and punishment in the Samoan culture (Clement, 1982). Delirious behavior that is seen as the result of possession by an angry ancestral sprit is treated by spirit healers, leading to exemption from blame for the ill person (Clement, 1982). However, if the possession is doubted, the ill person is regarded as responsible and may even be beaten as a result (Clement, 1982).

Waxler (1984) suggested that beliefs about mental illness center on supernatural causation in many of the developing countries; therefore, the person is not held responsible for his or her illness. Consequently, it is believed that the self remains unchanged and the person is able to shed the sick role quickly (Waxler, 1984). However, in situations in which mental illnesses are considered to be results of personality changes and personal responsibilities, ill persons receive messages that something is seriously

wrong, resulting in a shared perception and behavior conformity to the messages, leading to increased illness duration (Waxler, 1984).

Summary of Schizophrenia Impact

Family inability to adapt to the demands of a severe mental illness can create significant family hardships and result in family crisis (Saunders, 1999). Higher family functioning has been associated with more successful family coping, more family social support, less family psychological distress, and fewer patient behavioral problems (Saunders, 1999). Families who provide care for a member with SCZ are able to function more effectively as a family unit when they use more successful coping behaviors, and social support, thereby experiencing fewer instances of psychological distress and family member behavioral problems (Saunders, 1999). Families in crisis often tend to be disorganized and unable to regain stability, order, and a sense of coherence to the family system. The successful family adaptation to severe mental illness requires that adjustments be made in the family system in order to meet the needs of the ill family member, as well as meet the needs of the family as a unit (Saunders, 1999). Those families who already face a wide range of day-to-day stressors and who also have a member of the family with a severe mental illness, such as SCZ, may experience family system difficulty (Saunders, 1999). In summary, schizophrenia is a severe mental illness that is stressful not only for the patient, but also for the family members.

Treatment Strategies

Effective family functioning is important to family wellbeing as a whole (Saunders, 1999). Because families in crisis are often disorganized and are unable to

restore stability in the family system (Saunders, 1999) mental health professionals must learn to assess a variety of family issues objectively; these include coping, psychological distress, patient behavioral problems, and family social support. Saunders (1999) suggested empowering families by assisting them to recognize their strengths, their resources and their adaptive abilities. Family psychological distress may be addressed through communication with community agencies, crisis services, mental health professionals, family and individual therapy, psychoeducation and support groups. Patient behavioral problems may be addressed through effective medication management, supervision of the medication regimen, and teaching families behavior management techniques. Lastly, mental health professionals are encouraged to address family caregiver concerns and to identify ways in which more assistance may be provided to families (Saunders, 1999).

Families of individuals with SCZ are often emotionally, socially and physically burdened with illness relapses, resulting in feelings of incompetence and guilt, and leading to social isolation (Tellen, Herzog, & Kilbane, 1989). All of these stressors may negatively impact the caregiver's own health through the development of anxiety, depression or psychosomatic complaints (Ferriter & Huband, 2003; Jungbauer, Mory, & Angermeyer, 2002). In order to support the family and the individual with SCZ, as well as to prevent relapse, it is necessary, to treat not only the patients, but also involve the family, especially those who have demonstrated high-EE, in group or individual therapy (Gruber et al., 2005).

The concept of family burden comprises two dimensions: objective and subjective burden (Hoenig & Hamilton, 1966). Objective burden refers to day-to-day practical problems, such as limitations in leisure, social and work activities, loss of income, and disruption in family wellbeing (Cuijpers, 1999; Magliano et al., 1998; Webb et al., 1998). Subjective burden describes the negative psychological impact on the caregiver, including such feelings as loss, depression, anxiety and embarrassment (Magliano et al., 1998; Webb et al., 1998). Research suggested that the level of burden is reduced when family members have a more positive attitude toward the patient, when there is increased social support and fewer hospitalizations and improved social functioning of the patient (Cuijpers, 1999; Magliano et al., 2000; McDonell, Short, Berry, & Dyck, 2003; Saunders, 2003; Webb et al., 1998). Meta-analyses revealed that family interventions decreased the psychological distress experienced by family members, improved family functioning and improved the relationship between and among all family members, including the patient (Cuijpers, 1999; Pitschel-Walz et al., 2001).

Family Therapy

Treatment recommendations developed by the Schizophrenia Patient Outcomes Research Team strongly encouraged the necessity of family psychoeducation (Dixon, Adams, & Lucksted, 2000). The recommendations outlined the ideas that patients who have ongoing contact with their families should be offered a family psychosocial intervention, spanning at least nine months and providing a combination of education about illness, family support, crisis intervention and problem solving skills training (Leham et al., 1998). The main goals in working with the family of a person with a severe

mental illness are to accomplish the best outcome for the patient through collaborative treatment, as well as to reduce the burden experienced by the family through supporting their efforts to facilitate the recovery of the patient (Berglund, Vahlne, & Edman, 2003; Dixon et al., 2001; McDonnell et al., 2003). Although the models for family interventions differ, such as multiple-family, single-family or mixed sessions, duration of treatment and therapeutic orientation, such as systemic, or cognitive behavioral, (Dixon et al., 2000; Glanville & Dixon, 2005), the successful programs share several of the following key features: the coordination of all treatment services to ensure a collaborative and supportive relationship with all individuals working towards the same goal; explore the expectations of family members about the treatment program for both family and patient; assess the strengths and limitations of the family's ability to provide support to the patient; improve communication among family members; provide training in problem-solving techniques to the family; encourage family members to increase their social support systems, and last to provide the family with access to other healthcare professionals (Dixon et al., 2001).

Family-based psychoeducational treatment programs that focus on communication, support and problem-solving training aid in the management of SCZ (Zastowny, Lehman, Cole, & Kane, 1992). This treatment not only delays the recurrence of the maladaptive cognitive symptoms of SCZ, but it also substantially improves the patient's adaptive functioning and improves the family's ability to cope and manage the illness (Zastowny et al., 1992). Working with families to develop coping skills is increasingly well recognized as a basic tenet of successful treatment for individuals with

SCZ (Vaughn & Leff, 1981). Psychoeducational approaches included communication and problem-solving skills training and enhancing the family's understanding of the illness (Zastowny et al., 1992).

Well-structured educational programs to correct these deficits are currently available (Falloon et al., 1982; Reiss, 1969). One of the most successful of these programs uses a three-tiered approach. The first goal is to provide the family with information about SCZ; the second is to train the family to communicate more effectively and last to train the family to develop more systematic approaches to resolve problems (Falloon et al., 1982). This particular approach has been associated with significant reductions in readmission rates among individuals with chronic SCZ (Falloon et al., 1982).

In a study conducted by Zastowny et al. (1992), two forms of the psychoeducational approach were examined, using highly, treatment- resistant patients with SCZ and family members. First, the behavioral family management (BFM) program entailed the process of having families receive training in family communication and problem-solving. This program worked to identify family strengths and limitations in communication and problem-solving skills, and helped families develop new strategies and skills for dealing with difficulties (Zastowny et al., 1992). The techniques emphasized behavioral rehearsal with videotaped feedback and discussion involving a therapist, in modeling in the expression of positive and negative feelings, in effective listening, in communication of desires for behavioral change in others, as well as in reciprocal conversation (Zastowny et al., 1992). Structured and individualized problem-

solving methods were developed within each family, focusing on the identification of the problem, specification of goals to resolve the problem, listing alternative solutions and the advantages and disadvantages of each, implementation of the selected solution and subsequent revision of the solution to deal with unforeseen consequences (Zastowny et al., 1992). Sessions focused on actual difficulties encountered by the family with regard to the patient's illness and treatment, such as medication non-compliance, problematic behaviors related to SCZ, or disagreements between parents about the patient's care. Families also routinely completed weekly homework exercises for rehearsal and continued development of skills (Zastowny et al., 1992).

The supportive family management (SFM) entailed providing the family and patient with detailed information about illness, treatment plan, and services (Zastowny et al., 1992). Families were also provided with descriptions and explanations of community resources and facilitated connection to community services. Another aspect of this program included providing direct advice concerning management of crises and day-to-day patient difficulties, focused particularly on the patient's target symptoms and family issues (Zastowny et al., 1992). Brief family therapy techniques were also utilized when indicated but the main focus was to provide support to the family. Furthermore, families were indirectly referred to other sources of help when needed. In contrast to the BFM, there were no attempts to teach and systematically alter the families' communication patterns and problem solving by use of a broad behavioral training approach (Zastowny et al., 1992).

The findings of the study demonstrated clinical improvements in patients and in families both in the supportive and in the behavioral family management programs (Zastown et al., 1992). The investigators presupposed that the improvements were linked with the intensive care provided, such as aggressive medication management. Patients improved and sustained their progress in areas of functional status, symptom reductions, and reduction in behavioral problems (Zastowny et al., 1992). The salient aspects of both treatments focused on very basic elements of psychoeducational family work, including education, support and management advice and empathy. The BFM treatment program demonstrated superior effects in aiding patients and families to improve their skills in communications and problem-solving, and subsequently sustaining these positive changes (Zastowny et al., 1992).

Group Family Therapy

In an investigation conducted by Gruber et al. (2005), the efficacy of group treatment for parents of patients with SCZ was examined. Group psychotherapy was provided to the parents without patient involvement. The group psychodynamic supportive therapy consisted of improving the attitudes toward patient problems, improving adaptation, advice and suggestion, and boundary setting (Gruber et al., 2005).

The findings of the study indicated that a support group offers a place where parents can overcome the stigma of the illness (Gruber et al., 2005). The group also provided an opportunity for patents to relate with other parents who endure similar stressors, to build friendships and diminish social isolation. The parents reported that the group provided understanding and support, which they believed contributed most highly

to their wellbeing (Gruber et al., 2005). Additionally, the psychoeducational components contributed to family understanding and acceptance of the illness through enabling the family to understand more about the illness, methods of treatment and ways to reduce relapse (Gruber et al., 2005). Furthermore, the education sessions provided families with the opportunity to express concerns, ask questions, find emotional support and vent their thoughts and emotions. The investigators suggested that long-term therapy may be needed to re-establish the balance of the parents and the balance of the family unit (Gruber et al., 2005).

Individual Therapy

The growing empirical support for family- based services to aid in the stabilization of an individual with SCZ is striking; however, ongoing individual psychological services may be warranted for those FDFM experiencing anxiety or depression. Although literature is sparse in examining the cognitive and behavioral characteristics of efficacious treatment strategies for the individual with STPD, Beck et al. (2004) proposed a detailed treatment approach for individuals with STPD. Beck et al. (2004) proposed that the interpersonal aspects of therapy may be difficult for persons with STPD. They suggested that strategies should be collaboratively developed in the absence of social anxiety or suspiciousness. However, if social anxiety is a key factor of an individual's diagnostic picture, an assessment should be conducted and reasons to persist in therapy be addressed, because therapy may be an activity they wish to avoid (Beck et al., 2004). Suspiciousness should likewise be thoroughly assessed, because it

may extend to the therapist; therefore, the therapist should check about whether or not the patient believes the therapist to be trustworthy (Beck et al., 2004).

Beck et al. (2004) offered several specific interventions for individuals with STPD. Recommendations include the negotiation of a collaborative, prioritized problem list as a part of the initial homework task and discussion of these problems in the second session; this involves translating the list into specific, measurable, achievable, realistic and time-limited goals help to determine the direction of therapy (Beck et al., 2004). Developing goal lists that are proximal, which aim to make small meaningful changes rather than to eliminate symptoms, may be most useful. As is often the case with individuals with STPD, certain features of the disorder such as hallucinations may not be placed on the problem list, because they may not be associated with any distress or in some instances may provide comfort for the individual (Beck et al., 2004).

An additional recommended intervention included anxiety reduction. Beck et al. (2004) proposed that anxiety would be a part of treatment for individuals with STPD. Cognitive therapy for anxiety disorders has a large evidence base, and is suggested to be useful for persons with STPD presenting with anxiousness (Beck et al., 2004). A detailed assessment to determine if the anxiety is socially related or is due to suspiciousness or paranoia is believed key. Using a Dysfunctional Thought Record for homework was encouraged to help to elucidate the differentiation (Beck et al., 2004).

The next strategy Beck et al. (2004) suggested is paranoid belief change. Specifically, beliefs about being harmed and being talked about are generally interrelated and as a result can be addressed together. An examination of the development of the

individual's paranoid beliefs and ideas of reference was conducted followed by a consideration about how their advantages and disadvantages aid in paranoid belief change (Beck et al., 2004). Such a strategy provided a rationale for collaboratively examining the evidence for and against beliefs in relation to a recent situation in which an individual felt paranoid or socially anxious (Beck et al., 2004). Then, alternative explanations for such maladaptive thinking patterns were developed. Such verbal discussions are proposed to help reduce an individual's belief in paranoid thinking to the extent that the experience facilitates future behavioral experiments (Beck et al., 2004).

Next, Beck et al. (2004) suggested the use of behavioral experiments to aid in facilitating change. Research indicated that paranoid beliefs are more apt to be modified by behavior change through the use of a cognitive framework, than through the use of verbal reattribution methods alone (Chadwick & Lowe, 1990). After an individual has practiced consideration of the evidence, he or she may feel confident enough to change the behavior and subsequently test what happens (Beck et al., 2004). Each behavioral experiment should be planned carefully in session, with specific concrete predictions in relation to a specific belief to be tested. Additionally, any problems predicted in carrying out the experiment should be proactively addressed, including regular evaluations of whether or not the individual believes the therapist is trying to trick or humiliate him or her (Beck et al., 2004). Experiments should include modifying compensatory strategies or safety behaviors, because these assist the disconfirmation of paranoid or anxious beliefs (Beck et al., 2004).

After an individual has reduced social anxiety and/or paranoia, other problems may begin to resolve relatively easily (Beck et al., 2004). However, some individuals may have remaining concerns regarding the stigma associated with a label of STPD. By providing normalizing information, such as information on the continuum of STPD traits, the prevalence of hallucinatory and paranoid experiences in the general population, and the potential nature of unusual experiences, the therapist may help to reduce distress about the label and can support the individual in gaining an alternative understanding concerning the fact that he or she has developed certain ways of thinking and experiencing as a result of life experience rather than as a result of a defective personality (Beck et al., 2004). Such an alternative perspective may aid in reducing the person's view that he or she is abnormal and suffers other areas of associated distress (Beck et al., 2004). Schema change techniques, such as historical tests of the belief, use of continua in relation to worth and interest, and use of a positive data log for an alternative belief may assist in ultimately reframing core beliefs (Beck et al., 2004).

As therapy nears an end, a program for maintaining progress should be collaboratively developed with the individual (Beck et al., 2004). Booster sessions may be discussed and be scheduled to keep a check on progress, as well as to design a blueprint for relapse prevention. This may include a copy of the case formulation, a summary of the strategies that the individual with STPD has found helpful, in addition to a list of potential triggers for further difficulties, which include possible future life events that may reactivate his or her suspicious or anxious assumptions (Beck et al., 2004).

Furthermore, plans for effective coping for such life events are also collaboratively developed in-session (Beck et al., 2004).

Concluding Statement on Treatment

Recent research has indicated that 75% of patients have contact with family members and of those, only 31% reported that their families had received information, treatment, advice and/or support. In addition, only 8% reported that a family member attended an educational or support program about schizophrenia and treatment (Dixon, 1999). This striking information suggested that families of patients with SCZ are not accessing family interventions (Dixon, 1999). This deficit is concerning in light of the evidence suggesting that family interventions consistently reduce patient relapse and decrease family perceived burden (Cuijpers, 1999; Dixon, 1999; Pitschel-Walz et al., 2001). Improvements in clinical, social, and family functioning are expected to reduce the need for intensive medical and social care resulting in contained service costs and economic benefits for society and the mental health field (Falloon et al., 1999; Gruber et al., 2005). Because family members of a person with SCZ are often encouraged to participate in treatment for the reasons described, an understanding of those with whom mental health providers will come into contact is vital and as such will be further reviewed.

Overview of STPD

Research specific to schizotypal personality disorder (STPD) examined the impact of age, gender, and familial patterns on the clinical presentation of the illness. The disorder may appear initially in childhood or adolescence and is characterized by

isolation, poor peer friendships, social anxiety, academic difficulty, hypersensitivity, unusual thoughts and language, and last, strange fantasies (APA, 2000). The Diagnostic and Statistical Manual of Mental Disorders, fourth edition text revision (DSM-IV-TR) also noted that STPD may be present slightly more in males versus females (APA, 2000).

It is estimated that STPD affects approximately 3% of the general population (APA, 2000). Recent research has identified a familial link to this disorder, with an increased frequency noted in first-degree biological relatives of individuals with schizophrenia (SCZ) than in the general population (Baron, Gruen, Asnis, & Kane, 1983; Kendler & Gardner, 1997; Kendler, Gruenberg, & Kinney, 1994; Kendler, Gruenberg, & Strauss, 1981; Kendler et al., 1993). Specifically, the lifetime prevalence rate of STPD for family members of an individual with schizophrenia ranges between 4% and 13% (Kendler et al., 1993; Kendler et al., 1981; Kendler et al. , 1984; Siever & Gunderson, 1979).

Description of STPD Clinical Presentation

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition text revision characterizes schizotypal personality disorder as a pervasive pattern of social and interpersonal deficits accompanied by severe discomfort and limited ability for close relationships, in addition to cognitive and perceptual distortions and oddities of behavior (APA, 2000; Bentall, Claridge, & Slade, 1989; Bergman, Silverman, Harvey, Smith, & Siever, 2000; Dickey et al., 2005; Jacobsberg, Hymowitz, Barasch, & Frances, 1986; Williams, 1994). This pervasive pattern is often observed, beginning in early adulthood and witnessed in multiple contexts. Individuals with STPD tend to experience ideas of

reference, such as misappraisal of casual incidents, which are distinguished from referential delusions, frequently characterized by beliefs that are firmly held with delusional conviction (APA, 2000). Persons experiencing STPD may also be superstitious or preoccupied with paranormal phenomena inconsistent with their subcultures (APA, 2000). Commonly, these individuals may believe they possess special powers to sense events prior to their occurrence or possess the ability to read the thoughts of others. Individuals with STPD may also feel that they possess an ability to control others, magically, through direct implementation, such as believing that a significant other's completion of a chore is the direct and explicit result of thinking, an hour earlier, that it should be done (APA, 2000). Unusual perceptual experiences, including bodily illusions, may also be a common experience; there may also be idiosyncratic speech, characterized by unusual phrasing or sentence construction. Oddities of speech are described as loose, digressive or vague without derailment or incoherence. Responses of individuals with STPD may be overly concrete or overly abstract, with words or concepts applied in an unusual manner, such as stating that he/she was not "talkable" at work yesterday (APA, 2000).

Persons with STPD may be suspicious and possess paranoid ideation, for example believing that fellow colleagues are out to undermine them with their bosses (APA, 2000). These individuals may lack the ability to manage the full range of affect and interpersonal cuing, critical to developing and maintaining successful relationships, resulting in an inappropriate, stiff or constricted appearance. Often these persons are

viewed by others as odd or eccentric because of their unusual mannerisms, inattention to social conventions and unkempt manner of dress (APA, 2000).

Another key feature of STPD is discomfort in relating with others. Despite expressing sadness about their lack of relationships, their behaviors imply a decreased desire for intimacy (APA, 2000). Subsequently, other than first-degree relatives individuals with schizotypal personality disorder tend to have few or no close friends. These individuals find themselves becoming anxious in social situations most notably situations with unfamiliar people. Often the anxiety they experience stems from suspiciousness with respect to the motivations of others (APA, 2000).

Symptom Clustering of STPD

Psychometric research provided support for the notion that schizotypy is both a multidimensional and heterogeneous concept; however, the current debate attempts to distinguish between a two-dimensional versus a three-dimensional model of clinical presentation, at the crux of which lies the disorganized symptom subscale. Specifically, the literature is in general agreement that the symptoms of STPD tend to parallel the symptoms of schizophrenia with regard to positive and negative symptom subtype (Andreasen & Olsen, 1982; Williams, 1994). The third and debated distinction is the disorganized symptom subscale (Arndt, Alliger, & Andreasen, 1991; Kerns, 2006; Vollema & Postma, 2002).

One aspect of positive SCZ symptoms includes reality distortions, characterized by delusions and hallucinations (Liddle & Barnes, 1990). The STPD features of magical thinking and perceptual aberration are proposed to be a lesser expression of delusional

thinking and hallucinations (Williams, 1994). The other dimension of positive schizophrenia is composed of thought disorder, specifically ideas of reference, bizarre behavior, and poverty of speech, in addition to inappropriate affect, which was previously thought to be a component of the negative dimension (Liddle & Barnes, 1990; Williams, 1994). These symptoms specifically relate to difficulties of social adjustment (Williams, 1994). The anhedonic features of schizotypy, such as poor rapport, aloofness and guardedness, seem to parallel specific negative symptoms of schizophrenia such as anhedonia and affective flattening (Gardner, Walsh, & Kendler, 2001; Williams, 1994). Research has suggested that STPD physical anhedonia may be more definitively paralleled with negative symptoms of schizophrenia rather than social anhedonia (Chapman, Chapman, & Raulin, 1976; Williams, 1994).

Diagnostic Assessments

The diagnostic assessment of a personality disorder is a complex process that requires judgment regarding the presence or absence of pathological attitudes and behaviors based on characterlogic flaws of personality or culturally pervasive characteristics (Zimmerman & Coryell, 1990). A personality disorder is a pervasive pattern of inner experiences and behaviors that are enduring and inflexible, causing distress or impairment (Zimmerman & Coryell, 1990), and often-debated are the methods most effective in measuring this pattern. The most commonly utilized assessment tools are self-report inventories or semi-structured interviews.

Self-Report Inventories

Some inventories take a general approach to screening, including assessment of multiple symptoms, whereas other instruments assess a narrow range of symptoms. In a similar fashion, some self-report inventories assess a broadened definition of the schizotypy concept, such as psychosis proneness, whereas others focus on narrower, diagnostically defined features of schizotypy (Claridge et al., 1996). A review of the two notable self-report screening measures follows.

The well-noted and widely used Chapman Psychosis Proneness scales (PPS) individually assess core features of schizoid and schizotypal personality disorders (Ross, Lutz, & Bailley, 2002). The Chapman Psychosis Proneness scales measure schizotypic beliefs, symptoms and experiences through the administration of four individual scales. The PPS is composed of the Magical Ideation Scale, the Perceptual Aberration Scale, the Physical Anhedonia Scale and the Revised Social Anhedonia Scale. Results suggest that those scoring high on the PPS display greater numbers of schizotypal characteristics than those scoring lower on the scales (Chapman & Chapman, 1987). Additionally, item content examination of the PPS and DSM-IV diagnostic criteria for schizotypy indicates measurement of core symptoms of STPD (Ross et al., 2002).

Unlike most self-report measures, which measure one or two dimensions of STPD and does not specifically target schizotypal features, the Schizotypal Personality Questionnaire (SPQ) is designed to measure all nine DSM-III-R criteria for STPD (Vollema & Postma, 2002). The SPQ is a tool used to screen individuals for schizotypal traits, but may also be used as a measure of individual differences of STPD (Vollema &

Postma, 2002). The three major dimensions of schizotypy, cognitive-perceptual, social-interpersonal, and disorganization, can be specifically examined using the SPQ (Calkins, Curtis, Grove, & Iacono, 2004).

Semi-Structured Interviews

Semi-structured interviews are also used in research to assess and diagnose STPD. The Structured Interview for DSM-III Personality Disorders (SIDP) was developed and validated over a seven year period, and is the mostly widely studied personality disorder interview (Zimmerman & Coryell, 1990). In contrast to the closed-ended format of many self-report screening instruments, the SIDP includes both open-ended questions and closed-ended questions with follow-up probes as a means of eliciting individual examples of psychopathology (Zimmerman & Coryell, 1990). The results of a study investigating the concordance between the SIDP and the Personality Disorder Questionnaire (PDQ), a self-report true-false response format that assesses the 11 specific DSM-III personality disorders, found that assessments of personality disorders are generally poorly associated (Zimmerman & Coryell, 1990). Specifically, the investigation discovered that more individuals received a personality diagnosis on the SIDP, whereas multiple personality disorder diagnoses were given with the PDQ. Despite the inclusion of items that were reversed scored, it has been suggested that the PDQ is more vulnerable to yea-saying/nay-saying, reflecting nonspecific rather than specific personality disorder diagnostic criteria (Zimmernan & Coryell, 1990). Therefore the SIDP may be less vulnerable to this issue because of frequently asked questions collecting examples of pathological behavior. It is proposed that the lack of agreement between the SIDP and the

PDQ is a result of the differences in content rather than in methods of data collection (Zimmerman & Coryell, 1990).

The development of the Structured Interview for Schizotypy (SIS) stemmed from a perceived need for an interview-based assessment that specifically but also comprehensively examined schizotypy (Kendler, Lieberman, & Walsh, 1989). All SIS versions were designed to be given in conjunction with an Axis I assessment instrument. The last section of the SIS records the experience of STPD signs as based on observations made during both the Axis I and the SIS interviews (Kendler et al., 1989). The current version of the SIS, version 1.4, contains five item types: closed-option, field-coded, global symptom, specific signs, and global signs.

Closed-option items require the respondent to choose from a list of potential responses. Field-coded items entail asking the respondent open-ended questions, and based on the participant response, the interviewer codes one of a number of answers (Kendler et al., 1989). Global symptom scores, which are located at the end of most symptom scales, require the interviewer to rate the degree of pathology present in that symptom dimension on a 1-to-7-point scale, from marked to absent (Kendler et al., 1989). The interviewer on a particular category of behavior also rates specific signs. Lastly, the interviewer rates overall respondent performance on global signs in a broad category of behavior (Kendler et al., 1989).

The diagnostic category of STPD is examined in 19 sections, of which 18 sections assess individual symptom dimensions and one section assesses 36 individual signs (Kendler et al., 1989). Global symptom ratings are provided for 12 symptom scales,

which include social isolation, sensitivity, social anxiety, ideas of reference, suspiciousness, restricted emotions, magical thinking, illusions, psychotic-like phenomena, derealization-depersonalization, irritability, and impulsivity. The 19 sections of the SIS are as follows: childhood personality features, adolescent personality, social isolation, interpersonal sensitivity, social anxiety, ideas of reference (seeing meanings, being watched, being talked about), suspiciousness, restricted emotions, magical thinking, illusions, psychotic-like phenomena, derealization/depersonalization, antisocial/irritable behavior, borderline-like experiences (self-destructive behavior, affective instability, and boredom), impulsivity, and signs of schizotypy (rapport, affect, organization of speech, odd/eccentric behavior, suspiciousness, and minor signs) (Kendler et el., 1989).

Benefits and Limitations of Assessment Inventories

The utilization of self-report inventories in the field of psychological research is in part due to their ease of administration (Claridge et al., 1996). Additionally, self-report instruments are cost-effective and elicit no systematic bias or interview tendencies (Battaglia et al., 1997; Kendler, Thacker, & Walsh, 1996). However, with regard to the assessment of STPD symptoms and traits, many of the self-report inventories, unlike interviews, have not been explicitly developed, utilizing a solely schizotypal perspective (Claridge et al., 1996).

Questionnaires tend to be used mainly for screening purposes, whereas interviews tend to be used for the purposes of classification of schizotypal traits and schizotypal personality disorder (Vollema & Hoijtink, 2000). Interviews typically require significant

training and administration time, consequently requiring more financial investment. Lastly, Kendler et al. (1996) and Battaglia, Cavallini, Macciardi, and Bellodi (1997) suggested that questionnaires are ill suited in the assessment the schizotypal signs of aloofness, poor eye contact and restricted affect, whereas interviews better assess those facets of STPD.

Examination of STPD Research

Historically, research examining the clinical features of schizotypal personality disorder has focused on both the clinical and the familial diagnostic aspects included in the Diagnostic and Statistical Manual (Widiger, Frances, & Trull, 1987). The clinical approach has focused on the chronic, lifelong pattern of attenuated, subschizophrenic clinical presentation in patients seen in various clinical environments. The familial tradition, on the other hand, has focused on subschizophrenic symptomatology in the biological relatives of individuals with schizophrenia (Widiger et al., 1987).

The widely held belief in research is that schizophrenia, and therefore the spectrum disorder of schizotypal personality disorder, stems from an interaction between genetic vulnerability and stressful home environments as necessary for the full expression of the disorder (Lowrie & Raulin, 1990). The resulting term, diathesis/stress model, is used to describe this interaction. The diathesis/stress model supports the current belief that the clinical presentation of STPD may be different for relatives of individuals with SCZ than for those diagnosed with STPD without a relative with SCZ (Lowrie & Raulin, 1990). Consequently, research was conducted with both the general and familial populations to further clarify this potential distinction.

Clinical Tradition

Lowrie and Raulin (1990) believed that the development of schizotypy scales, such as the Chapman scales, provides a means for adopting a behavioral approach to the study of schizophrenia, utilizing the clinical tradition. They proposed that a particular advantage of adopting this approach over the genetic approach is that these scales permit the study of individuals from the general population, likely leading to more accurate identification of individuals with STPD and expanding of the pool of participants (Lowrie & Raulin, 1990). Therefore, persons who do not meet the familial tradition can be more accurately studied by investigating the clinical presentation (Lowrie & Raulin, 1990). A brief review of two strong studies utilizing the clinical tradition will be reviewed further.

Based on their assertions, Lowrie and Raulin (1990) investigated a means of developing accurate cuff-off scores to differentiate, clearly, those individuals with and without schizotypy in the general population. The investigators enrolled 3260 college students who completed three scales measuring schizotypy: Perceptual Aberration, Magical Ideation, and Cognitive Slippage. The results suggest that the criteria by which experimenters use to identify participants as belonging to the schizotypic taxonomy is in need of further examination (Lowrie & Raulin, 1990). The investigators suggested that the proposed range of the traditional cut-off score of 2.0 to 1.5 standard deviations above the mean on the scales may not be optimal, because their results suggest that a range of 2.8 to 1.7 is more appropriate (Lowrie & Raulin, 1990). Therefore, using the original cutoff scores may result in incorrectly identifying non-schizotypic individuals as

schizotypic. As a result, the investigators suggested further examination of optimal cutoff scores (Lowrie & Raulin, 1990).

In keeping with a similar strategy of screening individuals in the general population at risk for psychosis, including STPD, Cadenhead, Kumar and Braff (1996) screened college students, a common strategy for identifying subjects with schizotypy. Specifically, psychometric scales developed to measure psychotic-linked traits were the primary measures used. One of the main objectives of the investigation examined the optimum cutoff scores for classification of schizotypal or non-schizotypal, similar to the investigation of Lowrie and Raulin (1990). The investigators screened 1115 college students over two semesters and asked them to complete the Perceptual Aberration/Magical Ideation scale (PerMag), and the Physical Anhedonia scale (PhysAn). Individuals who scores two standard deviations above the mean on either the PerMag or on the PhysAn scale were selected as potential participants (Cadenhead et al., 1996).

Subsequently, 42 participants were then asked to participate in a "psychology experiment" for academic credit. All subjects completed a DSM-III diagnostic interview, the Structured Interview for DSM-IIIR Personality Disorders, the Brief Psychiatric Rating Scale, the Scales for the Assessment of Positive and Negative Symptoms, the Schedule for Affective Disorders and Schizophrenia, the Hamilton Depression Scale and the Minnesota Multiphasic Personality Inventory (Cadenhead, et al., 1996). The results demonstrated that the students who scored two standard deviations above the mean on the PerMag scale, but not on the PhysAn scale experienced more STPD symptoms, as

assessed by the Structured Interview for DSM Personality Disorders. None of the student participants who scored above 2 standard deviations above the mean on the PhysAn scale met criteria for STPD, but two met criteria for paranoid personality disorder (Cadenhead et al., 1996). Overall, the findings suggested that the college students who scored two standard deviations above the mean on the PerMag and PhsyAn scales were more likely to have increased levels of psychopathology. Furthermore, the results of the investigation did not support the idea that individuals identified with the Chapman scales of PerMag and PhsyAn are psychosis prone or part of the schizophrenia spectrum disorders (Cadenhead et al., 1996). Their findings indicated that the Chapman scales identified few individuals meeting DSM-IIIR criteria for STPD (Cadenhead et al., 1996). They suggested that this may stem from the fact that participants ranging in age from 18-22, as a function of having a limited number of years in adulthood may not have sufficient duration of STPD symptoms to meet the diagnostic criteria of a pervasive pattern of behavior (Cadenhead et al., 1996).

Familial Tradition

Research using the familial tradition examined the potential genetic implications of STPD. A number of investigators suggested that studying schizophrenia spectrum disorders, specifically, may aid in the clarification of the genetic causes and related neurophysiological deficits found in individuals with SCZ (Lichtermann, Karbe, & Maier, 2000). In an extensive review of family studies by Battaglia and Torgersen (1996), the relationship between schizophrenia and spectrum disorders was explored. Research identified an increase in the prevalence of schizotypal personality disorder

among relatives of individuals diagnosed with SCZ (Baron et al., 1985; Kendler & Gruenberg, 1984; Kendler et al., 1984), higher rates of schizophrenia among relatives of individuals diagnosed with schizotypal personality disorder (Battaglia, Bernardeschi, Franchini, Bellodi, & Smeraldi, 1995; Battaglia et al., 1991; Thacker, Adami, Moran, Lahti, & Cassady, 1993; Kendler & Walsh, 1995), and increased rates of prevalence of schizophrenia in the offspring of schizotypal parents (Baron et al., 1983).

Schizotypal personality disorder research utilizing the familial tradition often stemmed from adoptive, family and twin studies (Torgersen, 1985). These investigations demonstrated features of STPD found among relatives of persons diagnosed with schizophrenia. Reviews of well-known studies from the familial tradition are further reviewed.

Adoptive studies. The Danish Adoption studies from which the diagnostic criteria of schizotypal personality disorder are derived consisted of two types: the extended family study and the adopted-away study. Kety, Rosenthal, Wender and Schulsinger (1976) examined 34 adoptees with SCZ and a control group of adoptees without schizophrenia. The diagnoses of schizophrenia were divided into three categories: chronic, acute and borderline. The results of the investigation demonstrated increased prevalence rates of chronic and borderline schizophrenia among relatives of adoptees with SCZ than among relatives of the control adoptee participants (Kety et al., 1976). The results highlighted a relationship between borderline schizophrenia and disorders of the schizophrenia spectrum (Kety et al., 1976).

A re-analysis of the sample with a focus on the relationship between borderline SCZ and schizophrenia spectrum disorders was then conducted by Siever and Gunderson (1979). The investigators examined the relationship between chronic and borderline schizophrenia, which demonstrated statistically significant higher prevalence rates of borderline schizophrenia among the relatives of adoptees with chronic SCZ as compared with healthy comparison participants (Siever & Gunderson, 1979). Results also indicated no incidences of chronic SCZ among the relatives of adoptees with borderline schizophrenia; however, a 13% prevalence rate of borderline schizophrenia in the relatives of the adoptees diagnosed with SCZ was established (Siever & Gunderson, 1979). The study concluded, on the basis of the data, that biological relatives of adoptees with chronic schizophrenia appeared to have a higher prevalence of borderline schizophrenia, whereas the biological relatives of adoptees diagnosed with borderline schizophrenia did not have higher rates of chronic schizophrenia (Siever & Gunderson, 1979).

In a Danish adopted-away study, an opposite approach, as compared with the extended family adoption study, was utilized. Rosenthal, Wender, Kety, Welner & Schulsinger (1971) began with the examination of parents with SCZ whose children had been adopted-away. The control group was composed of normal parents with adopted-away offspring. A higher incidence rate of schizophrenia was noted in the adopted-away offspring of parents with a diagnosis of SCZ (Rosenthal et al., 1971).

A re-analysis of these findings was conducted by Siever and Gunderson (1979), and the relationship between chronic and borderline schizophrenia was examined. The

investigators noted two individuals with borderline schizophrenia and one individual with borderline schizophreniform among the 30 total adopted-away children of the parents with chronic schizophrenia (Siever & Gunderson, 1979). However, chronic schizophrenia among the offspring of parents with borderline schizophrenia was again not observed (Siever & Gunderson, 1979).

The Danish adoption studies purposefully examined borderline schizophrenia from which DSM-III diagnostic criteria for schizotypal personality disorder is derived; however, research suggested that borderline schizophrenia and STPD did not appear to be the same disorder (Torgersen, 1985). In attempt to further understand the distinction between these disorders, Kendler et al. (1981) applied the STPD DSM-III criteria to the interview records of the relatives in the Danish extended family study. The results demonstrated moderate correspondence between the diagnoses of borderline schizophrenia and DSM-III STPD. Specifically, the results demonstrated 98% specificity of STPD in relation to borderline schizophrenia, whereas only 31% sensitivity was found (Kendler et al., 1981). When uncertain borderline schizophrenia was removed from the calculation, the specificity was found to be 91%, whereas the sensitivity was found to be 40%. The results suggested that borderline and uncertain borderline schizophrenia seem to be more inclusive diagnoses than DSM-III schizotypal personality disorder (Kendler et al., 1981). Furthermore, an 11% incident rate of STPD in the biological relatives of adoptees with SCZ was identified. All but one case of STPD was found among the biological relatives of adoptees with chronic schizophrenia. Lastly, the investigators

suggested a genetic link between STPD and chronic schizophrenia, despite the small number of relatives in the study (Kendler et al., 1981).

Another investigation examining the interviews from the Danish adoption extended family study examined the records of the individuals with borderline schizophrenia (Gunderson, Siever, & Spaulding, 1983). Two of the investigators blindly and independently reviewed the records from the same study to identify individuals either with STPD or with borderline schizophrenia. The key goal was to examine biological relatives with borderline schizophrenia of adoptees with SCZ, compared with control individuals diagnosed with SCZ, in addition to examining the relationship of the STPD criteria to borderline schizophrenia (Gunderson et al., 1983). Although the DSM-III STPD diagnostic criteria influenced the study definition of schizotypal personality disorder, affective impoverishment, asociality, and shallow relationships were included within the definition. This combined definition permitted the investigators to avoid circularity in research design (Gunderson et al., 1983).

Gunderson et al. (1983), therefore, compared the diagnosis of STPD with borderline SCZ, and obtained a sensitivity of 59% and a specificity of 81% when using DSM-III diagnostic criteria. When the investigators used their own criteria for STPD, they obtained a sensitivity of 52% and a specificity of 89% (Gunderson et al., 1983). These findings demonstrated, as did the findings of Kendler et al. (1981), that the symptom overlap between STPD and borderline SCZ was not striking (Torgersen, 1985).

Gunderson et al. (1983) specifically found that fewer of the biological relatives diagnosed with borderline SCZ of adoptees with chronic SCZ met STPD than did other

relatives with borderline SCZ and control participants. Noted symptoms of self-destructiveness, psychotic-like experiences, demanding manner, and past psychiatric contacts were less common in the relatives with borderline SCZ of individuals with chronic SCZ than in other relatives with borderline SCZ and control participants (Gunderson et al., 1983). The relatives of individuals with chronic SCZ who received a diagnosis of borderline SCZ in the original Danish study had less dramatic and severe psychopathology (Gunderson et al., 1983). Individuals with borderline SCZ were more often unemployed and eccentric, were more interpersonally and affectively detached, more depressed and less impulsive, and experienced more somatic problems when compared with borderline personality disorder (Gunderson et al., 1983).

Several investigators have also examined data from the adopted-away Danish study. Khouri, Haier, Rieder and Rosenthal (1980) examined the adopted-away study in an attempt to identify a genetic link between STPD and SCZ. The investigators developed the Symptom Schedule for the Diagnosis of Borderline Schizophrenia based on the description of borderline SCZ by Kety et al. (1976). The instrument examined perceptual and behavioral changes, such as altered perception, feelings of unreality, and ideas of reference. Fourteen interview records of adoptees that were diagnosed with borderline schizophrenia in the original Danish study had the scheduled applied. Seventeen other interview records with mixed psychopathology, but non-psychotic, and three comparison subject interview records also had the schedule applied. Two blind and independent researchers rated the interview records. The investigators reported a

sensitivity of 79% with a specificity of 100% in differentiating borderline SCZ from controls (Khouri et al., 1980).

In an attempt to apply DSM-III STPD criteria to the adopted-away study, Lowing, Mirsky & Pereira (1983) examined the interview protocols of the parents. Parents who met DSM-III criteria for chronic, acute, borderline and mixed symptoms of schizophrenia were included. All parents with symptoms of bipolar disorder, other affective symptoms, or unclear psychotic symptom presentations were excluded. The number of parents was reduced from 156 to 78 and 39 for the index adopted-away children, as based on the above criteria. The DSM-III STPD criteria application indicated that 15% of the index as compared with 8% control offspring met criteria for schizotypy (Lowing et al., 1983).

In an attempt to improve upon an earlier investigation, Kendler and Gruenberg (1984) applied DSM-III STPD criteria to the index adoptees in the Danish extended family study. The results demonstrated that 6% of the relatives of the adoptees with SCZ had schizophrenia and 14% had Schizotypy (Kendler & Gruenberg, 1984). When SCZ, schizoaffective disorder, and STPD were grouped together, schizophrenia spectrum adoptees evidenced similar percentages: 4% with schizophrenia and 13% with STPD in the relatives. Of the six relatives, of an adoptee with STPD, none met criteria for SCZ but two met criteria for borderline personality disorder (Kendler & Gruenberg, 1984). Overall the adoptive studies indicated that the biological relatives of individuals with SCZ have a higher risk of the syndrome termed borderline schizophrenia, which partially overlaps with the DSM-III defined STPD (Torgersen, 1985).

Family studies. Torgersen (1985) proposed that adoptive studies were the best way to demonstrate the genetic link between two disorders, but those studies of relatives with probands who were raised with their biological families also provides information regarding the importance of genetic factors. More specifically, family studies were better equipped at disconfirming than at confirming a genetic relationship, primarily through the observation of presence or absence of a disorder of a relative of a proband. Torgersen (1985) stated that few family studies aiming to specify the relationship between individuals diagnosed with STPD and SCZ have been conducted.

Stone (1979) examined consecutive inpatient admissions to a psychiatric hospital. The relatives of probands with a psychotic, borderline or a normal personality structure were compared. None of the probands had relatives with schizophrenia, but two of the relatives had STPD. This investigation not only provided evidence for the relationship between STPD and SCZ, but it also indicated that STPD may be familial (Stone, 1979).

Soloff and Millward (1983) also studied inpatient admissions using the Spitzer, Endicott and Gibbons (1979) definition of borderline, which encompassed both DSM-III criteria for schizoid personality disorder (SPD) and borderline personality disorder. Interviews with both patients and family informants were conducted to obtain family psychiatric histories, as well as chart reviews. Soloff and Millward (1983) determined that the prevalence of SCZ to be the same in the relatives of STPD, of borderline personality disorder and of depressive patients, and approximately half of that in the relatives of individuals diagnosed with schizophrenia. Eccentric or peculiar behavior was more common among the relatives of individuals with STPD and with borderline

personality disorder than in the relatives of individuals with depression and SCZ (Soloff & Millward, 1983).

The investigators also examined the relatives of probands with STPD only, probands meeting criteria for both STPD and BPD, and probands only with a diagnosis of BPD,only. Observed results indicated that nearly all relatives with SCZ of individuals with STPD and BPD were relatives of cases that were solely the mixed diagnoses of STPD/BPD (Soloff & Millward, 1983). None of the relatives of the probands with only STPD and only one relative of a proband with only BPD was diagnosed with SCZ. More common among relatives of probands with mixed diagnoses was eccentric and peculiar behavior. Therefore it was hypothesized that the mixed STPD/BPD group may have been more closely related to SCZ than to pure STPD or BPD (Soloff & Millward, 1983). These increased rates of eccentric and peculiar behaviors in families of individuals with STPD and BPD, as compared with families of probands with SCZ or depression are believed to suggest a familial transmission of borderline states, including STPD (Torgersen, 1985).

Baron et al. (1983) also conducted an investigation examining patients admitted to hospitals. The probands included 74 individuals diagnosed with chronic SCZ. Parents and siblings of the probands completed the Schedule for Affective Disorders and Schizophrenia, and the Schedule for Interviewing Borderlines. The DSM-III criteria and the Research Diagnostic Criteria (RDC) were utilized for diagnostic assessment. During data analysis, the families were divided into three groups, based on the manifestation of STPD in parents: the STPD and STPD group, which is defined as both parents having

definite or likely STPD; the STPD and the N group which is defined as only one parent meeting criteria for STPD and the other does not; and last the N and N group, defined as neither parent's having STPD. Age-corrected morbidity risk for SCZ and STPD was calculated for the siblings of the probands in each group (Baron et al., 1983).

The results yielded prevalence rates for STPD to be highest among siblings in the STPD and STPD group, somewhat lower among the siblings in the STPD and N group, and the lowest for the N and N group (Baron et al., 1983). Noteworthy was the fact that the same finding for the prevalence of SCZ among siblings was observed in all three participant groups. Baron et al. (1983) asserted that the study findings confirm the STPD familial transmission and the STPD genetic relatedness to SCZ.

Kendler et al. (1984) conducted a blind family history study with FDFM of consecutive admissions to a Veterans Affairs medical center. The criterion for schizoid-schizotypal personality disorder was characterized by social isolation, eccentric behavior, and deviant communication. The results demonstrated a morbidity risk of 4% for schizoid-schizotypal personality disorder among the FDFM of individuals diagnosed with SCZ as compared with 0% among the relatives of normal comparison subjects (Kendler et al., 1984). The reviewed results appeared to lead to conclusions similar to the adoptive studies: STPD is related to SCZ, but SCZ may not be related to STPD (Torgersen, 1985).

Twin studies. Torgersen (1985) suggested that twin studies provided a unique opportunity to investigate the etiology of homogeneous diagnoses. It was expected that because twin partners experience similar family home environments, nosological variants with similar familial transmission were expected to appear in the same twin pair

(Torgersen, 1985). As monozygotic twins (MZ) share an identical genetic make-up and dizygotic twins (DZ) are no more genetically similar than siblings, a genetic link between two different diagnostic variants indicated that both diagnoses are more often found in the same monozygotic twin pairs than in dizygotic twin pairs (Torgersen, 1985).

Siever and Gunderson (1979) extensively reviewed relevant twin studies, including works by Essen-Møller (1970) and Fischer (1972), with several key observations noted. First, the investigators estimated that between 7% and 25 % of the MZ twin pairs could be broadly diagnosed with borderline schizophrenia, whereas 6% to 10% of DZ twin pairs could be similarly categorized (Essen-Møller, 1970; Fischer, 1972). Additionally, many cotwins of MZ individuals with schizophrenia experienced non-psychiatric peculiarities. For example, mild peculiar characteristics resembled the cognitive distortions and atypical mentations found in adoptive studies (Siever & Gunderson, 1979). The review noted the lack of schizophrenia spectrum twin studies reporting borderline schizophrenia index twin with a chronic cotwin with schizophrenia (Siever & Gunderson, 1979).

In a study conducted by Torgersen (1984) same-sexed twin pairs were ascertained through probands with schizotypy, who were admitted to inpatient and outpatient facilities. A total of 59 index twins were diagnosed with DSM-III STPD, and 15 of the 59 additionally met criteria for DSM-III BPD; 10 index twins received a BPD diagnosis only. The diagnoses were based on personal interviews, which entailed the completion of the structured Penn State Examination, an anamnestic interview, and a personality questionnaire. The comparison group consisted of non-psychotic twins who did not meet

criteria for STPD or BPD, and were subsequently age, sex and zygosity matched (Torgersen, 1984).

Prior to participating in Torgersen's investigation, the twins underwent independent and blind diagnoses based on the Norwegian term "borderline psychosis" (Hoch & Polatin, 1949; Knight, 1953) by Torgersen and two psychiatrists. The sensitivity of a diagnosis of BPD and SPD in selecting persons diagnosed with borderline psychosis was 97%, with a specificity of 67%. The concept of borderline psychosis seemed to be narrower than the BPD and STPD criteria, because almost all with borderline psychosis were diagnosed with BPD and/or STPD (Torgersen, 1984). When considering STPD diagnoses only, the sensitivity was 89% with a specificity of 74% (Torgersen, 1984).

A total of 28 MZ twin probands (21 STPD, 4 STPD/BPD, and 3 BPD), and 41 DZ twin probands (23 STPD, 11 STPD/BPD, and 7 BPD) were enrolled. The prevalence rates of schizophrenia in the cotwins sample was less than 1.5% and 1.7% when only the 59 STPD and STPD/BPD pairs were considered (Torgersen, 1984). Among the MZ cotwins, the prevalence was less than 4 percent in the total proband group and less than 4.1% in the group of STPD and STPD/BPD twin pairs (Torgersen, 1984). The investigator suggested that the results did not confirm the existence of a genetic link between DSM-III STPD and SCZ. The results showed that 33% of cotwins of MZ individuals with STPD were also STPD, as compared with 4% of the DZ cotwins. The findings also demonstrated that none of the cotwin met STPD diagnostic criteria in the

STPD/BPD or the BPD groups, suggesting that STPD was genetically determined (Torgersen, 1984).

The results of twin studies paralleled the results of both the adoptive and the family studies (Torgersen, 1985). Specifically, if among twin pairs the proband was diagnosed with schizophrenia, schizotypal personality disorder was likely to be found among the cotwins; however, if individuals with schizotypy were the probands, generally schizophrenia was not observed in the cotwins. Therefore, STPD seemed to have a strong genetic basis (Torgersen, 1985).

Research Examining Sex Differences

Sex Differences in SCZ

Numerous attempts to delineate symptom patterns of schizophrenia have been conducted to assist in the diagnostic formulation of SCZ. One of the key areas of interest has been the distinction between positive and negative symptoms (Baron, Gruen, & Romo-Gruen, 1992). Delusions and hallucinations, often considered florid clinical features, are typically classified as positive symptoms, whereas blunted affect and alogia, often considered deficit states, are typically classified as negative symptoms (Baron et al., 1992). Research specifically examining differentiation of symptom subtype in schizophrenia has been well studied, in addition to studies on the impact of sex differences on clinical presentation and symptom subtype.

With regard to symptomatology, more men with schizophrenia experience an amotivational syndrome, characterized by negative symptoms, loss of organization and lack of goal orientation (Lewine, 1985). Specifically, men are more likely to exhibit

classic symptoms of schizophrenia than are women. Men tend to be more quiet and passive (Lewine, 1981; Runyon, Wagner, & Dambrot, 1985), and women tend to express more affective symptoms (Lewine, 1981; Venables & Bailes, 1994). Males tend to experience poorer premorbid social competence than females diagnosed with schizophrenia. Work by Goldstein and Link (1988) supported these findings, because their research indicated that men are more likely to exhibit withdrawal and isolation, in addition to greater inability to function. Women with schizophrenia, however, tended to express higher levels of paranoia, impulsivity, and affective symptoms (Goldstein & Link, 1988). Research also indicated that women with schizophrenia are more socially skilled than males with schizophrenia; this appeared to be an enduring characteristic (Mueser, Bellack, Morrison, & Wade, 1990).

Sex Differences in STPD

These findings on symptom presentation of schizophrenia are also believed to parallel schizotypal personality disorder (Raine, 1992). However, a majority of the research has been conducted using self-report measures of psychosis proneness and schizotypal personality traits in nonclinical populations, such as college students (Miler & Burns, 1995). The literature indicated that females with STPD have been found to score higher than males on scales of hallucinatory predisposition, magical ideation, and perceptual aberration (Muntaner, Garcia-Sevilla, Fernandez, & Torrubia, 1988; Young, Bentall, Slade, & Dewey, 1986), as well as ideas of reference and odd beliefs (Raine, 1992). Males tended to score higher than females on scales of physical and social anhedonia (Chapman et al., 1976; Kendler & Hewitt, 1992; Miller & Burns, 1995;

Muntaner et al., 1988) as well as subscales measuring no closes friends and constricted affect (Raine, 1992). Stated simply, females tended to exhibit more positive symptoms, whereas males tended to exhibit more negative symptoms.

Fanous, Gardner, Walsh & Kendler (2001) examined the relationship between classic positive and negative symptoms of schizophrenia in relation to schizotypal personality disorder in first-degree relatives. Positive schizotypy was characterized by ideas of reference, illusions and magical thinking, whereas negative STPD was characterized by poor rapport, aloofness and guardedness (Fanous et al., 2001). The results of the investigation indicated that probands diagnosed with SCZ who exhibit negative symptoms predicted more schizotypal factors in relatives, such as odd speech, suspicious behavior and social dysfunction. Positive symptoms experienced by probands with SCZ predicted positive STPD, BPD symptoms and social dysfunction in relatives (Fanous et al., 2001).

This study was one of the first to demonstrate a shared familial etiology of positive and negative symptom dimensions between schizophrenia and Schizotypy (Fanous et al., 2001). The results indicated that negative symptoms achieved statistically significant relationships with more schizotypal factors than did positive SCZ symptoms, suggesting that negative symptoms have greater familial and possible genetic bases than do positive symptoms (Fanous et al., 2001). The phenomenological resemblance of SCZ negative symptoms appeared more similar to negative symptoms of schizotypy than that observed between positive SCZ symptoms and positive STPD symptoms (Fanous et al., 2001). The current literature base lacked examination of positive and negative symptom

dimensions of schizotypal personality disorder in FDFM of individuals diagnosed with schizophrenia, examining all nine facets of the DSM-IV diagnoses. The present study attempted to examine this deficit specifically.

Chapter Three: Hypotheses

Schizophrenia (SCZ) is a devastating mental illness with far-reaching consequences, resulting in significant economic, social and familial strains and burdens. The negative attitudes of relatives towards their loved ones with SCZ is one of the most powerful predictors of clinical relapse in SCZ (Kavanagh, 1992), resulting in an increased economic burden on the family and the mental health community (Rice, 1999; Lindstrom et al., 2007; Weiden & Olfson, 1995). Treatment strategies have identified medication management as being one of the most effective strategies to assist the schizophrenia-ill individual with stabilization, but many investigators also call for family treatment interventions (Cuijpers, 1999; Dixon, 1999; Pitschel-Walz et al., 2001). Knowing that a familial link exists between STPD and SCZ, and the likelihood of mental health professionals coming into contact with a SCZ family member with STPD or with features of the disorder may be beneficial in assisting them in developing stress management strategies that potentially restore family adaptability. ????

Based on recent literature asserting that male individuals with schizophrenia possess more negative features of the disorder, whereas females with schizophrenia posses more positive features of the disorder (APA, 2000; Lewine, 1985), it was hypothesized that similar sex symptom presentation would be observed in first degree family members with traits of STPD, because a genetic link is indicated for the relationship between individuals with schizophrenia and their first-degree family members with schizotypal personality disorder (Baron et al., 1985; Kendler & Gruenberg, 1984; Kendler et al., 1984). A majority of the research examining sex differences in

STPD was conducted using self-report measures in nonclinical populations, such as college students (Miler & Burns, 1995). This base of literature indicated that females with STPD scored higher on scales of hallucinatory predisposition, magical ideation, and perceptual aberration (Muntaner et al., 1988; Young et al., 1986), as well as ideas of reference and odd beliefs (Raine, 1992). Males tended to score higher than females on scales of physical and social anhedonia (Chapman et al., 1976; Kendler & Hewitt, 1992; Miller & Burns, 1995; Muntaner et al., 1988) as well as subscales measuring no close friends and constricted affect (Raine, 1992). Current research lacked examination of positive and negative symptom dimensions of schizotypal personality disorder in first-degree family members of individuals diagnosed with schizophrenia, examining all nine facets of the DSM-IV diagnoses, using a semistructured diagnostic interview. This present study attempted to expand the needed literature base. Therefore, the following research hypotheses were proposed:

1. It was hypothesized that female first-degree family members of an individual with SCZ would present with more positive symptomatology of schizotypal personality disorder, whereas male first-degree family members of an individual with schizophrenia would present with more negative symptomatology of STPD, as compared with a healthy control sample.
2. Second, mothers of children with schizophrenia would present with more positive traits of schizotypal personality disorder, whereas fathers of children with schizophrenia would present with more negative traits of STPD.

3. Last, it was hypothesized that sisters of a sibling with schizophrenia would present with more positive symptomatology of schizotypal traits, but that brothers of a sibling with SCZ would present with more negative symptomatology.

Chapter Four: Methods

Methodology Overview

Participant data was obtained from three genetic family studies funded by The National Institute of Mental Health's (NIMH) Genetic Linkage Initiative (Nurnberger et al., 1994) conducted at the University of Pennsylvania's Schizophrenia Research Center. Consenting processes and diagnostic interviewing procedures were conducted either in participant homes or at the Schizophrenia Research Center. Data utilized in this present investigation were from participants, 18 years or older, who were healthy comparison subjects or first-degree family members (FDFM) of an individual diagnosed with schizophrenia, determined by center consensus diagnosis procedures; met individual study inclusion and exclusion criteria, and completed a diagnostic interview containing the Structured Interview for Schizotypy.

Design and Design Justification

The present study was an archival study, in which subject information was obtained from previous participation in research. This investigation examined sex differences based on FDFM of probands with schizophrenia responses to the Structured Interview for Schizotypy (SIS). Specifically, sex differences were examined in relation to features of STPD, as assessed by the SIS. A brief overview of each study from which archival data were drawn will be reviewed, followed by the methodological design of the present study.

Overview of Genetic Family Studies

Each of the studies was funded through the National Institute of Mental Health's (NIMH) Genetics Initiative for genetic studies of schizophrenia and mood disorders. The purpose of the multi-site study titled, "A Family Study of Brain Behavior Relationships" was to apply a new strategy for the study of brain and behavior through the examination of the family unit of affected individuals, as well as of families with no manifestation of brain disorders (Gur et al., 2007). Specifically, the study goals included assessing the genetic liability of SCZ and assessing the clinical features associated with schizophrenia in family members of participants with the disorder, as compared with families without the brain disorder (Gur et al., 2007). Lastly, the familial pattern of neurobehavioral function in affected and unaffected families were evaluated and related to clinical and genetic findings (Gur et al., 2007).

The purpose of the multi-site study titled, "Schizophrenia Liability Genes Among African Americans" was to identify schizophrenia liability genes among African-American families (Aliye et al., 2006). Specifically, both clinical phenotypes and neurocognitive endophenotypes were used to maximize linkage signals. The aim of the study was to enroll a sufficient number of families to permit localization of susceptibility/liability genes and to perform fine mapping techniques (Aliyu et al., 2006).

The last study from which archival data was utilized was titled, "Consortium on the Genetics of Schizophrenia: The Genetics of Endophenotypes and Schizophrenia". The purpose of the investigation was threefold. The investigators attempted to measure six endophenotypes in SCZ patients and their relatives; to determine whether or not the

measured endophenotypes in SCZ patients and relatives reflect the influence of a single common gene or multiple genes, and last to utilize the endophenotype measures in conjunction with a genome scan in patients and FDFM to potentially to identify genes regulating the six schizophrenia endophenotypes (Calkins et al., 2007). All participants by self-report were medically healthy and enrolled subjects of any self-identified race or ethnicity (Calkins et al., 2007).

Participant ascertainment for each investigation was investigation-specific, based on detailed study inclusion and exclusion criteria. Participant recruitment strategies were also study-specific, using such strategies as referrals from mental health and consumer organizations; clinical referrals; advertisements and flyers, and referral from other studies (Aliyu et al., 2006; Calkins et al., 2007; Gur et al., 2007). Potential participants underwent standardized, semi-structured screening procedures either in person or via telephone. During the screening, information regarding subject eligibility was collected; this included referral source, current clinical symptoms, brief medical history, family structure and family history of mental illness. If appropriate, permission to review relevant medical records was obtained during the initial screening. Senior staff reviewed each completed screening form and based on individual study inclusion-exclusion criteria, those identified as likely eligible participants were invited to enroll in the study (Calkins et al., 2007). For individual study methodological information, see Aliyu et al. (2006), Calkins et al. (2007) and Gur et al. (2007).

Genetic Studies Procedures

Prior to enrollment, each participant underwent consenting procedures. Each of the genetic studies included procedures not relevant to the current investigation, such as a blood donation, and neurocognitive testing. However, all participants completed, in-person, a psychiatric evaluation that included the Diagnostic Interview for Genetic Studies (DIGS). Trained clinical interviewers conducted the DIGS, with established reliability and under supervision of investigators (Gur et al., 2007).

Diagnostic interviewers learned to administer the clinical assessment instruments effectively, using a standardized training procedure developed by a clinical psychologist with extensive training and experience in semistructured interviewing techniques (Calkins et al., 2007). The purpose of the training protocol was to enhance and facilitate the clinical skill and knowledge of psychopathology required to administer the semistructured interviews skillfully. The protocol specifically consisted of didactic sessions, observation, and supervised practice. A series of ten videotapes of didactics covered major psychopathology and differential diagnoses, specific skills of semistructured interviewing, documentation practices, and item-by-item review of assessment instruments, rating scales and study-specific operational definitions (Calkins et al., 2007). Furthermore, each trainee practiced interviewing skills with mock participants and observed interviews conducted by trained senior staff. Finally, interviewers in training underwent supervised practice with at least three participants and underwent ongoing supervision by senior clinicians (Calkins et al., 2007).

Consensus diagnosis procedures consisted of two doctoral level investigators who reviewed each case independently and provided DSM-IV multiaxial lifetime diagnosis (Aliyu et al., 2006; Calkins et al., 2007; Gur et al., 2007). Subjects with psychotic features or instances of disagreement between the investigators were presented at a consensus conference, and complex cases were discussed between sites. Interrater reliability among investigators and interviewers was tested a regular intervals using videotaped interviews and bimonthly joint interviews, depending on the study. For more detailed, study-specific information regarding additional procedures, interrater reliability of interviewers and consensus diagnosis procedures, see Aliyu et al. (2006), Calkins et al. (2007) and Gur et al. (2007).

Measures of Genetic Studies

Each participant completed the Diagnostic Interview for Genetic Studies (DIGS), which was developed by the National Institute of Mental Health's (NIMH) Genetics Initiative for genetic studies of schizophrenia and mood disorders (Nurnberger et al., 1994). This semi-structured interview generates diagnoses according to several diagnostic systems, including, the Research Diagnostic Criteria (RDC), Modified RDC, DSM-III, DSM-III-R, DSM-IV, and the Washington University Criteria and the International Classification of Diseases, 10th revision (ICD-10) (Nurnberger et al., 1994). However, these genetic studies used DSM-IV diagnoses for their analyses and consensus diagnoses. The instrument provides not only self-report demographic information and medical history, but also a detailed assessment of psychotic, mood and substance-related

symptoms, which allowed for reliable, differential diagnosis of related disorders (Nurnberger et al., 1994).

Within the semi-structured interview, additional measures were embedded. These measures included the Mini Mental Status Examination (MMSE); Global Assessment Scale (GAS) with anchor points to permit a functional assessment; the Scale for the Assessment of Positive Symptoms (SAPS) and the Scale for the Assessment of Negative Symptoms (SANS) to permit clinical symptoms ratings. The final embedded measure was the modified version of the Structured Interview for Schizotypy (SIS), which permitted the assessment of schizotypal and other axis II cluster A personality features (Kendler et al., 1989; Nurnberger et al., 1994).

Present Investigation

Participants

Archival data from these three identified, NIMH-funded genetic family studies was used for the present investigation. First-degree family members that were 18 years or older, who had completed the Diagnostic Interview for Genetic Studies, with the embedded Structured Interview for Schizotypy (SIS), and who had met study-specific inclusion and exclusion criteria were included in the investigation. First-degree family members with a psychotic diagnosis were excluded from the study. For this investigation, only interview questions from the SIS were utilized. A total of 29 FDFM, with a male: female ratio of 14:15, respectively was used from the "Family Study of Brain Behavior Relationships"; 98 participant data from the study titled "Schizophrenia Liability Genes Among African Americans", with a male: female ratio of 43:55 was

used, and 84 participant data were used from the "Consortium on the Genetics of Schizophrenia: The Genetics of Endophenotypes and Schizophrenia", with a male: female ratio of 40:44.

Only data from healthy comparison subjects were used from the "Schizophrenia Liability Genes Among African Americans" and "Consortium on the Genetics of Schizophrenia: The Genetics of Endophenotypes and Schizophrenia" studies, because the DIGS, along with the SIS, had been completed at the time of participation. Healthy comparison subjects from the "Family Study of Brain Behavior Relationships" did not complete the DIGS, and therefore were not included in the present investigation. A total of 28 subjects with a male: female ratio of 11:17 was utilized from the genetic liability study and 78 participants' data, with a male: female ratio of 38:40, were used from the consortium study. To make the male: female ratio in the control sample more comparable, 7 additional female healthy comparison participants, 18 years or older, who were recruited and assessed, using the same diagnostic instruments as indicated, for non-genetic Brain Behavior studies were added.

Procedures

Permission to use shelved data was granted by Raquel Gur, M.D., Ph.D., the director of the Schizophrenia Research Center at the University of Pennsylvania, on January 18, 2008, following a detailed proposal meeting. After the Institutional Review Board review process was completed at the Philadelphia College of Osteopathic Medicine and permission to proceed with proposed study was granted, existing data were obatained through the datacore at the Schizophrenia Research Center. The shelved data

used in this present investigation was entered into an individual SIS database by trained staff and quality control steps were taken; these consisted of double checking data entry by another trained staff member.

The datacore, as instructed by Dr. Raquel Gur and Dr. Monica Calkins, accessed data from the clinical database to provide demographic information, and to transfer the electronic data from the individual SIS databases for all four studies to an excel spreadsheet without identifiers, to be provided to this investigator. After the de-identified data were received, raw SIS scores were converted into dichotomous scores based on Kenneth Kendler's differentiation of nonclinical and clinical SIS repsonses, where appropriate. Specifically, items rated two or below were considered nonclincial and ascribed a value of 0, whereas items rated at three or above were considered clinical and ascribed a value of 1. Non-global interview items were used. Statistical analyses was completed at the Brain Behavior Laboratory with a senior investigator; this included examining FDFM in a combined group; however, to evaluate potential age and cohort effects on the pattern of sex differences, parents and siblings were also analyzed separately.

Investigation Measure

Structured interview for schizotypy. The sole measure of the present investigation was the modified version of Structured Interview for Schizotypy. The original SIS was developed by Kenneth Kendler, following experience gained from a large-sample, controlled family study of schizophrenia, which was conducted in the county of Roscommon located in Western Ireland (Kendler et al., 1989). The development of the

SIS stemmed from perceived limitations with available schizotypy assessment measures available at the time (Kendler et al., 1989).

The structured interview has undergone five revisions since 1984. All versions were designed to be administered in conjunction with an instrument assessing Axis I psychopathology (Kendler et al., 1989). The last section of the SIS is designed to record signs of schizotypy, based on observations made by the interviewer during both an Axis I interview and the SIS (Kendler et al., 1989).

All SIS, post version 1.0, require coding of responses to all individual questions (Kendler et al., 1989). Most symptom probes are in a closed-option format. The interview entails standard questions for quantity of social contacts and uses expanded signs and symptoms scales with items adapted from other instruments. Last, in an effort to maximize the validity of the assessment of key symptom features, multiple item questions with slightly differing content were included (Kendler et al., 1989). For a review of the reliability and validity development of the SIS, see Appendix.

Modified structured interview for schizotypy. A modified version of Kendler's SIS, version 1.5, was utilized for The National Institute of Mental Health's (NIMH) Genetic Linkage Initiative (Farone, Peppel, & Tsuang, 1997; Nurnberger et al., 1994). The SIS was originally designed to assess a broad array of schizotypal signs and symptoms, in order to assess signs and symptoms to meet DSM-III-R criteria for schizotypal, schizoid, and paranoid personality disorders, as well as to assess DSM-IV criteria for schizotypal personality disorder (Farone et al., 1997). The 13 sections of the modified version of the SIS 1.5 were as follows: social isolation, interpersonal sensitivity,

social anxiety, ideas of reference, being watched, seeing meanings, remarks or being talked about, suspiciousness, restricted emotions, magical thinking, illusions, psychotic-like phenomena, and major and minor signs of Schizotypy (Farone et al., 1997). Major signs consisted of rapport, affect, organization of speech, odd or eccentric behavior, suspiciousness, and minor signs included respondents' irritability, mood, anxiety level, occupational and social functioning, and questions regarding the degree to which the respondent comprehended the interview questions (Farone et al., 1997).

The modified interview comprises four types of items: closed-option items field-coded items, global assessment ratings, and ratings of clinical observations during the interview (Farone et al., 1997). A majority of the items were closed-option items, which were based on participant self-reports. The field-coded items were open-ended questions that require the interviewer to probe areas of interest and make ratings based on the participant's descriptions of symptoms and behaviors (Farone et al., 1997). The responsibility fell with interviewers to elicit sufficient information from the participant to make appropriate ratings. Follow-up questions may have been needed on closed-option items linked to a field-coded rating in order to make appropriate ratings (Farone et al., 1997).

The global assessment ratings were also interviewer rated. The ratings were judgment-based following the completion of each section, based on all relevant responses to a common content area, such as introversion (Farone et al., 1997). These ratings were made on a numerical scale with a range of zero to six; zero indicates absence and six indicates marked presence. A low rating is indicative of normality, whereas high ratings

were indicative of pathology. The beliefs and behaviors that occur frequently and/or would be considered culturally or subculturally deviant and/or which have no realistic basis were given the greatest weight (Farone et al., 1997).

Clinical observation ratings were located at the end of the interview. The ratings were made post-interview session and were based on interviewer observations during the administration of the DIGS, FIGS and Modified SIS (Farone et al., 1997). The ratings were made primarily on a 5-point scale, ranging from zero to four. A zero rating indicated normative functioning and a four rating indicated pathological functioning (Farone et al., 1997).

The modified version of the SIS assessed only enduring personality attributes in adulthood (Farone et al., 1997). The sections pertaining to childhood, adolescence and the previous three years were eliminated in the modified version of the SIS (Farone et al., 1997). When interviewers made lifetime adult ratings for field-coded and global ratings, both severity and chronicity were factored into the decision-made rating. If participant behavior changed over time, ratings were then made to reflect behaviors most characteristic of the adult individual (Farone et al., 1997).

Closed-option items were read exactly as written and the participant's answer was recorded for one of the response options. When in doubt, the respondent was encouraged to choose a single best response (Farone et al., 1997). In the event that the participant did not understand an item, an explanation was permitted, but encouragement was given not to deviate very much from the original question. Follow-probes may have been used in order to make appropriate field-coded and global ratings (Farone et al., 1997).

Field-coded items typically involved more open-ended questions. When information obtained was insufficient to make necessary ratings, additional questioning was permitted (Farone et al., 1997). The rating reflected the answer that was believed to have been valid. Ratings were based on the respondent's verbal and nonverbal behavior and clinical intuition. Judgmental leaps of intuition were discouraged (Farone et al., 1997).

Global assessment ratings were made as an estimation of clinical significance, taking into account the frequency and possible realistic basis for the symptom (Farone et al., 1997). Departure from normality, defined as deviance from cultural and subcultural norms, was also factored into global assessment ratings. Overall the ratings were derived from information obtained over the entire interview, including additional instruments. Kendler's (1989) recommended procedure was coded as the interview proceeded. At times new information may have arisen, requiring the interviewer to return and to adjust scoring. For those individuals who were difficult to rate during the interview, Kendler (1989) recommended that an initial attempt be made and then a review of scores be completed at the end of the interview.

Coding conventions were modified to facilitate global ratings in the modified SIS. Most often, the response options of closed-option and field-coded items were number coded (0, 2, 4, 6) to correspond to the four anchor points of absent, mild, moderate and marked of a global assessment rating (Farone et al., 1997). This adaptation was changed to aid the interviewer in assessing the direction of the responses quickly, from normal to pathological. The use of modified SIS coding instructions did not mean that a four-

option response was on a 7-point scale (Farone et al., 1997). One of the provided options was chosen for the closed-option and field-coded items. Kendler's descriptive anchor points for the 7-point global assessment ratings were used in making the final ratings (Farone et al., 1997). A rating of zero indicated no evidence of symptoms in assessed area or a few clinically insignificant responses; a rating of one indicated a few symptoms were present, but very mild and clinically not significant; a two indicated symptoms were noticeable, but fairly subtle and without clinical significance; a rating of three indicated symptoms were clearly present and some clinical significance; a four indicated symptoms were definitely present, were not severe but had some clinical impact; a rating of five indicated that symptoms were quite pronounced but not at the extreme of severity, and a six indicated symptoms were present and very severe (Farone et al., 1997).

Global scores took into account the frequency of the symptoms, the possible realistic basis for the symptom and the cultural and subcultural norm deviance. (Farone et al., 1997) The global score was not an average of component item scores, but some items may have been weighed more heavily than others. Those symptoms considered mild were weighted less than more severe symptoms in a given dimension (Farone et al., 1997). At times a single deviant symptom of sufficient severity could heavily influenced a rating, despite the absence of pathology on other items within that dimension (Farone et al., 1997).

Ratings observed during the interview were based on interviewer observations and impressions of a participant during the entire interview process, including informal

discussion periods or the Axis I interview (Farone et al., 1997). In order to assess disorganization of speech/thought, it was suggested that the participant be provided an opportunity for uninterrupted speech about a single topic, because this was not provided in the SIS (Farone et al., 1997).

Specific item modifications of the SIS as per Farone et al. (1997) were as follows:

1. Social Isolation: Some adaptations were made to items Q1 and Q2 to reflect DSM-IV criterion 6 for STPD.
2. Introversion Dimension: After Q13 a skip-out was added.
3. Sensitivity Dimension: All items were from the original SIS.
4. Anger to Perceived Slights: A new section, questions Q20-24, was added to assess DSM-III-R criterion A.6 for paranoid personality disorder. The new items were drawn from the SID-P (Q20-23) and a global rating (Q24).
5. Social Anxiety Dimension: For question 25-30, no changes were made to the original items. Question 31 was added to meet DSM-IV criterion 2, excessive social anxiety, for STPD.
6. Ideas of Reference – Being Watched: Question 39 and global rating (Q40) were added to meet DSM-IV criterion 2 for STPD.
7. Ideas of Reference – Seeing Meanings: Omitted.
8. Ideas of Reference – Remarks: A possible probe added for the “dropping hints” item (Q45).
9. Suspiciousness: All original SIS items.

10. Pathological Jealousy: Two adapted SID-P items (Q58-59) and global rating (Q60) were added to meet DSM-III-R criterion A.7 of paranoid personality disorder.
11. Magical Thinking: All original SIS items.
12. Illusions: A series of coded-option items were deleted.
13. Psychotic-like Phenomena: The order of some questions was changed (Q82 and Q82a). For a net reduction of five items, thought and emotion questions were doubled-up (Q83-85, Q85a, b).
14. Sexual Anhedonia: Added sexual experience (Q87) and desire (Q87a, Q88) if needed to meet DSM-III-R criteria A.4 for schizoid personality disorder. Global rating for sexual anhedonia added.

Because the modified SIS instrument assessed not only schizotypal personality disorder, but also schizoid and paranoid personality disorders to map on to other self-report STPD measures from research, rationally derived subscales corresponding to Kendler's groups were developed. The individual SIS items were portioned into four groups: positive symptoms, negative symptoms, disorganized symptoms and other. The individual groupings were then portioned into the nine diagnostic criteria for STPD: ideas of reference; magical thinking; unusual perceptual experiences; paranoid ideation; social anxiety; no close friends; constricted affect; odd behaviors; and speech. Each of the nine subscales comprised a set of individual question items that correspond with the theme of the subscale and received total scores, as individual question items were tallied to achieve subscale scores.

Chapter Five: Results

Overview of Analyses

Prior to statistical analyses of sex differences on SIS responses, participant education level, participant parental education level and age were examined to assess their comparability across groups. First-degree family members of an individual diagnosed with schizophrenia from these three identified studies were examined in a combined group, but to evaluate potential age and cohort effects on the pattern of sex differences, parents and siblings were also analyzed separately. In addition, community comparison subjects (CCS) who participated were also examined in a combined group. An alpha level of .05 was used for all statistical tests, and to provide an estimate of magnitude of group differences independent of significance values, effect sizes were calculated using Cohen's d and were interpreted according to Cohen's guidelines (small, $d = .2$; medium, $d = .5$; large, $d = .8$).

Preliminary Analyses

A sample of 362 participants, including both relatives and normal comparison subjects, met inclusion and exclusion criteria. One-way Analysis of Variance (ANOVA) was conducted to assess between group differences in participant education, parental education and age, yielded statistically significant differences between relatives and comparison subjects in participant education ($F = 4.27$, $df = 1, 360$; $p < .05$), and age ($F = 55.57$, $df = 1, 360$; $p < .01$). Specifically, community comparison participants reported greater education than relatives (relatives, $M = 13.84$, $SD = 2.86$; CCS, $M = 14.50$, $SD = 2.75$) and relatives were significantly older than healthy comparison subjects (relatives,

M = 48.06, *SD* = 15.93; CCS, *M* = 35.36, *SD* = 13.25). ANOVA's of maternal (*F* = 2.72, *df* = 1, 321; *p* = .10), and paternal (*F* = 0.68, *df* = 1, 299; *p* = .41) education between groups did not yield a significant difference. Sex distribution between groups was additionally examined and found not to be statistically significant (two-way chi-square = 0.01, *df* = 1; *p* = .94).

In an attempt to examine groups more closely matched in age, analyses comparing sibling and control samples were conducted as well. One-way ANOVA's of parental education between siblings and comparison subjects remained nonsignificant (maternal education, *F* = 0.01, *df* = 1, 222; *p* = .94; paternal education, *F* = 0.87, *df* = 1, 207, *p* = .35). An ANOVA for participant education between siblings and healthy comparison participants was not significant (*F* = 3.16, *df* = 1, 242; *p* = .08). An ANOVA of sibling age compared with CCS age was statistically significant (*F* = 6.53, *df* = 1, 242; *p* < .01), with siblings being older (siblings, *M* = 39.52, *SD* = 12.14; CCS, *M* = 35.36, *SD* = 13.24). Sex distribution between siblings and comparison participants was not significant (two-way chi-square = 0.70, *df* = 1; *p* = .40).

Sample Refinement

To reduce the disproportionate demographic characteristics between the relative and community comparison samples, participants over the age of 65 were excluded from the total sample, leaving 324 participants. Following this exclusion, participant education, parental education, age, MMSE total scores, and sex was examined between relatives and CCS. One-way ANOVA's indicated that participant education was no longer statistically significant (*F* = 2.70, *df* = 1, 322; *p* = .10); however, age between

groups differed significantly ($F = 41.55$, $df = 1, 322$; $p < .01$), with relatives significantly older than controls (see Table 1). Groups differed significantly in maternal education as indicated by a one-way ANOVA ($F = 11.03$, $df = 1, 289$; $p < .01$), with mothers of controls obtaining significantly more education than mothers of relatives (see Table 1). Relatives and comparison participants did not significantly differ for paternal education ($F = 3.05$, $df = 1, 322$; $p = .08$) as per one-way ANOVA. The findings of a one-way ANOVA indicated that MMSE total scores between groups did not differ significantly ($F = 3.51$, $df = 1, 320$; $p = .06$). Last, sex distribution between groups did not differ significantly (two-way chi-square = 0.20, $df = 1$; $p = .65$).

As an adjunctive strategy to compare groups more closely matched in age, analyses between sibling and control samples, ranging in age from 18 to 65 were conducted, examining participant education, parental education, age, MMSE total scores, and sex. One-way ANOVA's indicated that participant education ($F = 2.41$, $df = 1, 236$; $p = .12$), maternal education ($F = 3.31$, $df = 1, 216$; $p = .07$), paternal education ($F = 0.06$, $df = 1, 201$; $p = .81$), and total MMSE score ($F = 1.15$, $df = 1, 234$; $p = .29$) were not significantly different between these two groups. However, siblings were significantly older than comparison subjects ($F = 8.53$, $df = 1, 322$; $p < .01$; see Table 1). Sex distribution was again found not to differ significantly between the groups (two-way chi-square = 0.71, $df = 1$; $p = .40$).

Participant diagnosis as determined by center-wide consensus procedures was explored with the sample containing participants between the ages of 18 and 65. None of the healthy comparison subjects received a diagnosis of bipolar disorder or cluster A

personality disorder (see Table 2), with a majority of healthy comparison participants receiving no diagnosis (*f* = 93, *P* = 82; see Table 2). Seven comparison subjects received a major depressive disorder diagnosis (*f* = 7, *P* = 6.2) and 13 received another Axis I or II diagnosis without schizophrenia/schizoaffective, major depressive disorder, or bipolar I disorder (*f* = 13, *P* = 11.5; see Table 2).

In the sample of relatives, a majority did not receive an Axis I or II diagnosis (*f* = 110, *P* = 52.1; see Table 2). Two family members received a diagnosis of bipolar I disorder (*f* = 2, *P* = 0.9) and 36 received a major depressive disorder diagnosis (*f* = 36, *P* = 17.1; see Table 2). Lastly, a total of 63 family participants received another Axis I or II diagnosis without schizophrenia/schizoaffective, major depressive disorder, or bipolar I disorder (*f* = 110, *P* = 52.1; see Table 2) with nine specifically receiving a cluster A personality disorder diagnosis.

Interview Reliability and Validity

The final stage of pre-analyses, including participants between the ages of 18 and 65, explored interview reliability and validity for both the relatives and comparison subjects. Interviewer ratings indicate that for both relatives and CCS, a majority of participants found the interview length to be about right (relatives, *f* = 178, *P* = 84.4; CCS, *f* = 105, *P* = 92.9; see Table 3). Interviewer ratings indicate that for both relatives and comparison subjects that a majority ranged between open and very open in their responses to questions (see Table 4). Participant understanding of interview questions ranged between poor to excellent for the entire sample, with a majority rated as possessing excellent understanding of the interview questions (relatives, *f* = 153, *P* =

72.5; CCS, $f = 91$, $P = 80.5$; see Table 5). Interviewer-rated overall quality of interview was also examined, with a majority of interviews rated as high quality (relatives, $f = 176$, $P = 83.4$; CCS, $f = 105$, $P = 92.9$; see Table 6).

SIS Scoring and Analyses of SIS Responses

The individual SIS items were portioned into four scales: positive symptoms, negative symptoms, disorganized symptoms and "other", as well as into the nine diagnostic criteria for STPD: ideas of reference; magical thinking; unusual perceptual experiences; paranoid ideation; social anxiety; no close friends; constricted affect; odd behaviors; and odd speech. Each of these nine subscales, comprising individual question items corresponding with the diagnostic criteria, received total scores via tallying individual question scores within each subscales to achieve subscale scores. Next, each subscale was tallied to develop a total SIS score for each participant. See Figure 1 for SIS subscales and participant means.

Prior to analyzing the sample according to the stated hypotheses, frequency of participant unanswered questions was examined to determine the extent of missing data. Questions in which ten or more participant answers were missing in the database were excluded in the development of the nine diagnostic subscales, SIS total score and subsequent data analyses (see Table 7), because missing participant data may have yielded misleading results in the analyses. A total of 78 participants were identified as missing at least one SIS item, leaving 246 participants with complete SIS data across subscales. Because this restricted (n=246) group allows only individuals with complete data for all SIS items, it is identified as the "conservative" sample, in contrast to the more

liberal "inclusive" sample, which allowed individuals to miss some SIS responses. As a result of this further sampling restriction, conservative sample demographics were examined to determine comparability in demographics between relatives and community comparison groups.

Conservative Sample Demographics

Participant education ($F = 2.21$, $df = 1, 244$; $p = .14$), and paternal education ($F = 1.66$, $df = 1, 203$; $p = .20$), did not differ significantly between relatives and comparison subjects (ANOVA's). However, age ($F = 30.17$, $df = 1, 244$; $p < .01$), and maternal education ($F = 10.78$, $df = 1, 220$; $p < .01$; see Table 8), did differ, with relatives significantly older than CCS and comparison subjects reporting greater maternal education (see Table 8). However, in relatives, age did not correlate with SIS scales or subscales, and in community comparison participants, age evidenced only a very small correlation with only two of the diagnostic STPD subscales, inappropriate affect ($r = -.23$, $n = 90$, $p = .03$) and social anxiety ($r = .22$, $n = 90$, $p = .03$). Therefore, age was ignored in subsequent analyses. MMSE scores did not differ significantly between groups ($F = 2.60$, $df = 1, 243$; $p = .11$). Sex distribution between these two groups did not differ significantly (two-way chi-square = 0.52, $df = 1$; $p = .47$; see Table 8).

For conservative siblings and comparison subjects, participant education ($F = 2.68$, $df = 1, 181$; $p = .10$), maternal education ($F = 3.22$, $df = 1, 164$; $p = .07$), paternal education ($F = 0.27$, $df = 1, 157$; $p = .60$), and MMSE total score ($F = 0.84$, $df = 1, 180$; $p = .36$; see Table 8), did not differ significantly (ANOVA's), and sex distribution between these two groups did not differ significantly (two-way chi-square = 0.69, $df = 1$; $p = .41$).

However, siblings were significantly older than comparison subjects (ANOVA, $F = 4.40$, $df = 1, 181$; $p < .05$; see Table 8).

Preliminary Analyses Summary

In summary, the preliminary analyses aimed to assess and reduce demographic differences between the relative and community comparison samples through utilizing only participants between the ages of 18 and 65. This sample refinement yielded an overall pool of participants that did not differ significantly in participant education, paternal education, MMSE total scores, and sex distribution. However, age between the groups remained statistically significant with relatives, including parents and siblings, older than CCS. In addition, maternal education yielded statistical significance; CCS mothers attained more education than the mothers of relatives. Therefore, analyses restricting the participant pool to sibling and CCS were conducted to attain more comparable groups. Results indicated that participant education, parental education, MMSE total scores, and sex distribution did not differ between these groups; however, age remained statistically significant, with siblings being older than CCS.

Following sample refinement, diagnostic frequencies were examined with a majority of participants receiving no Axis I or II diagnoses. In addition, interview reliability and validity were examined with the newly balanced sample, and overall participant openness and understanding of interview questions was generally good. The quality of the interview as rated by the interviewer was also noted as generally good.

Analyses of SIS data indicated that among this inclusive participant pool, 78 participants were missing at least one SIS item. Therefore, a more conservative pool of

subjects was formed, which included only participants with complete SIS data. Demographic analyses of the conservative sample yielded nearly identical results as the inclusive sample analyses, because relatives in the conservative sample did not differ significantly from CCS in education, paternal education, MMSE scores and sex distribution. However, statistical differences were again noted with participant age and maternal education. An identical pattern of results was observed for conservative sample siblings verses community comparison subjects. Diagnostic frequencies of relatives and community comparison participants were also examined and the results were similar to the inclusive sample with a majority of participants with no Axis I or II diagnoses (see Table 9). Because the conservative sample demographic analyses were consistent with the inclusive sample demographic analyses, but included only participants with complete SIS data, all primary analyses were conducted with the conservative sample. Following the primary analyses of the study hypotheses, a secondary set of analyses was conducted with the inclusive sample to determine if the results remained consistent, despite missing data for interview questions (see Table 10 for results overview).

Data Analyses

Conservative Sample Analyses

First hypothesis analysis. It was hypothesized that female first-degree family members of an individual with SCZ would present with more positive symptomatology of schizotypal personality disorder, whereas male first-degree family members of an individual with schizophrenia would present with more negative symptomatology of STPD, as compared with a community comparison sample. A multivariate analysis of

variance (MANOVA) of the nine STPD subscales in the conservative sample revealed a main effect for group (relatives v. controls; $F = 2.03$, $df = 9, 234$; $p < .05$), with post hoc analyses indicating that relatives as a group endorsed more clinically significant STPD subscales items than controls. However, there were no significant sex differences ($F=1.81$, $df=9,234$, $p =.07$), indicating that males and females did not significantly differ in endorsed STPD features, and no interaction between group and sex ($F = 0.80$, $df = 9, 234$; $p = .62$; see Figure 2). The significance level ($p = .07$) indicates a potential trend for sex differences, with post-hoc's suggesting that males reported more symptoms of social isolation than female counterparts ($F = 12.15$, $df = 1, 245$; $p = .01$; see Figure 3). Between relatives and comparison subjects, family members reported more clinically significant symptoms of unusual perceptual experiences ($F = 9.76$, $df = 1, 245$; $p < .01$) and odd thinking/speech ($F = 9.68$, $df = 1, 245$; $p < .01$) (see Figure 4). In addition, relatives tended to endorse more magical thinking ($F = 2.87$, $df = 1, 245$; $p = .09$); fewer close friends ($F = 3.34$, $df = 1, 245$; $p = .07$), and greater social anxiety ($F = 3.83$, $df = 1, 245$; $p = .052$) than comparison subjects, but these trends failed to achieve significance (see Figure 4). Consistent with the STPD subscale analyses, a one-way ANOVA indicated that relatives had higher mean SIS total scores than comparison subjects ($F = 7.11$, $df = 1, 245$; $p < .01$; see Figure 4), but there were no significant sex differences ($F = 2.70$, $df = 1, 245$; $p = .10$; see Figure 3) and no interaction between sex and group ($F = 0.02$, $df = 1, 245$, $p = .88$; see Figure 2). Therefore, the first hypothesis was not supported. Although the sex differences hypothesis was not supported, clinically relevant results were evident, in which relatives endorsed more features of STPD than CCS in the

areas of unusual perceptual experiences and odd speech, with trends noted in magical thinking, lack of close friends and social anxiety. For effect sizes see Table 11.

Second hypothesis analysis. It was hypothesized that mothers of children with schizophrenia would present with more positive traits of schizotypal personality disorder, whereas fathers of children with schizophrenia would present with more negative traits of STPD. Sex differences among parental first-degree family members (FDFM) were examined only within group and healthy comparison subjects were not utilized because of the significant age difference among groups. A MANOVA of the nine STPD subscales did not yield a significant sex difference ($F = 1.42$, $df = 8, 49$; $p = .21$), indicating that males and female parents did not differ in endorsed STPD features, and examination of total SIS score also yielded no significant difference (ANOVA, $F = 0.02$, $df = 1, 56$; $p = .90$). Although the analyses were nonsignificant, post-hoc's suggest that male parents reported more affect restriction than their female counterparts ($F = 4.07$, $df = 1, 56$; $p = .05$). Therefore, the second hypothesis was unsupported. For effect sizes see Table 12.

Third hypothesis analysis. It was hypothesized that sisters of a sibling with schizophrenia would present with more positive symptomatology of schizotypal traits but that brothers of a sibling with SCZ would present with more negative symptomatology. A MANOVA of the STPD subscales in the conservative sample revealed a main effect for group (siblings v. controls; MANOVA, $F = 2.54$, $df = 9, 171$; $p < .01$), with post hoc analyses indicating that siblings as a group endorsed more clinically significant STPD subscales than CCS. Significant sex differences were observed (MANOVA, $F = 1.96$, df

= 9, 171; $p < .05$), indicating that males endorsed more significant STPD subscales than females. However, there was no interaction between group and sex ($F = 0.72$, $df = 9, 171$; $p = .69$). Between siblings and CCS, siblings reported more clinically significant symptoms of unusual perceptual experiences ($F = 10.64$, $df = 1, 182$; $p < .01$), odd thinking and speech ($F = 11.50$, $df = 1, 182$; $p < .01$), suspiciousness and paranoia ($F = 4.33$, $df = 1, 182$; $p < .05$), and social anxiety ($F = 5.69$, $df = 1, 182$; $p < .05$) than healthy comparison subjects (see Figure 5). In addition, siblings tended to endorse more magical thinking ($F = 3.12$, $df = 1, 182$; $p = .08$) and fewer close friends ($F = 3.84$, $df = 1, 182$; $p = .05$) than CCS, but failed to achieve significance (see Figure 5). Between males and females, males reported significantly fewer close friends than female counterparts ($F = 14.90$, $df = 1, 182$; $p < .01$). Additionally, a trend was observed, with males endorsing more items of suspiciousness and paranoia than females ($F = 2.81$, $df = 1, 182$; $p = .10$; males $M = 3.20$, $SD = 3.24$; females $M = 2.37$, $SD = 2.99$), but significance was not achieved. Consistent with the STPD subscale analyses, a one-way ANOVA indicated that siblings had higher mean SIS total scores than comparison subjects ($F = 8.45$, $df = 1, 182$; $p < .01$; see Figure 5), but there were not significant sex differences ($F = 3.60$, $df = 1, 182$; $p = .06$) and no interaction between sex and group ($F = 0.32$, $df = 1, 182$; $p = .57$). Therefore, the third hypothesis was not supported. Although the results did not support the research hypothesis, clinically relevant information is noteworthy. In particular, siblings endorsed more features of STPD than CCS in the areas of unusual perceptual experiences, odd speech, suspiciousness, and social anxiety, with trends noted in magical thinking and lack of close friends. For effect sizes refer to Table 13.

Inclusive Sample Analyses

To ensure that the decision to run primary analyses with the conservative sample was not overly narrow, with the exclusion of participants missing at least one SIS item, analyses were rerun utilizing the inclusive sample. A majority of the results with the conservative sample were upheld with the inclusive sample. The instances in which the results differed are discussed.

First hypothesis analysis. Similar to the conservative sample, a MANOVA of the nine STPD subscales in the inclusive sample revealed a main effect for group (relatives v. controls; $F = 2.57$, $df = 9, 312$; $p < .01$), which is consistent with higher SIS total scores for relatives than for CCS (ANOVA, $F = 7.11$, $df = 1, 246$; $p < .01$). Post hoc analyses indicated that relatives as a group endorsed more clinically significant STPD subscales than CCS. Post hoc analyses indicated that inclusive sample relatives endorsed more features of STPD than conservative counterparts. As a group, inclusive family members reported more clinically significant symptoms of magical thinking ($F = 4.81$, $df = 1, 323$; $p < .05$), unusual perceptual experiences ($F = 9.78$, $df = 1, 323$; $p < .01$), odd thinking/speech ($F = 13.64$, $df = 1, 323$; $p < .01$), lack of close friends ($F = 4.78$, $df = 1, 323$; $p < .05$), and social anxiety ($F = 5.23$, $df = 1, 323$; $p < .05$) (see Figure 6). However, unlike the conservative sample, sex differences were significant (MANOVA; $F = 1.91$, $df = 9, 312$; $p < .05$), indicating that males endorse more symptoms of STPD. More specifically, between subject effects indicated that regardless of group, males endorsed significantly more items consistent with fewer close friends than did females ($F = 13.57$, $df = 1, 323$; $p < .01$), and a nonsignificant trend was noted, indicating that males reported

greater affect restriction ($F = 2.89$, $df = 1, 323$; $p = .09$) (see Figure 7). Group and sex interactions remained unchanged. Therefore, the first hypothesis that female FDFM would present with more positive symptoms whereas male FDFM would present with more negative STPD symptoms was not supported, but relatives endorsed more features of STPD than did CCS. Calculated Cohen's d effect sizes can be viewed in Table 14.

Second and third hypothesis analyses. A MANOVA examining sex differences between parental FDFM was consistent with the results of the conservative sample with the second hypothesis remaining unsupported. With regard to the third hypothesis, similar findings were observed with the inclusive sample, indicating that a main effect for group was yielded; however, siblings in the inclusive sample endorsed more features of STPD than did siblings in the conservative sample *(*MANOVA*,* $F = 2.82$, $df = 9, 226$; $p < .01$). Between subject effects indicated that siblings tended to report more magical thinking ($F = 4.65$, $df = 1, 237$; $p < .05$), unusual perceptual experiences ($F = 9.60$, $df = 1, 237$; $p < .01$), odd thinking and speech ($F = 16.09$, $df = 1, 237$; $p < .01$), suspiciousness and paranoia ($F = 4.77$, $df = 1, 237$; $p < .05$), lack of close friends ($F = 5.10$, $df = 1, 237$; $p < .05$), and social anxiety ($F = 6.77$, $df = 1, 237$; $p < .010$) (see Figure 8) than did comparison subjects. Therefore the third hypothesis was not supported; however, siblings were found to endorse more symptoms of STPD than did community comparison subjects. For effect sizes calculated using Cohen's d, refer to Table 15 for hypothesis two analyses and Table 16 for hypothesis three analyses.

Summary of Data Analyses

Overall, the results of the present investigation did not support the proposed hypotheses, and therefore diagnostic effects were not calculated. Nonetheless, clinically relevant findings were observed. Relatives consistently reported experiencing unusual perceptual experiences and odd thinking and speech in both the conservative and inclusive samples. Additionally, in both samples, siblings consistently reported more suspiciousness and social anxiety than did comparison subjects. These findings have implications for both genetic research and clinical treatment.

Chapter Six: Discussion

Overview of Findings

In this investigation, sex differences were not observed between relatives, compared with healthy comparison participants; male parents compared with female parents; and siblings compared with comparison subjects. However, in all analyses in which relatives or siblings were compared with healthy comparison subjects, relatives were found to endorse, significantly, more symptoms consistent with STPD. This finding is consistent with prior work reporting increased schizotypal features in FDFM of individuals with SCZ than in the general population (Baron et al., 1983; Kendler & Gardner, 1997; Kendler et al., 1994; Kendler et al., 1981; Kendler et al., 1993).

In the current study, relatives from both the conservative and the inclusive samples consistently reported unusual perceptual experiences and odd thinking and speech. Occurring only within the inclusive sample, relatives reported more magical thinking, social isolation and social anxiety. In an examination of participants closer in age, siblings versus comparison participants reported more suspiciousness and social anxiety in both the conservative and inclusive samples. Additionally, the analyses of the inclusive sample also demonstrated that siblings endorsed more items of magical thinking and social isolation than healthy comparison subjects or parental participants, suggesting that siblings may have a higher risk of STPD symptoms than parents. These results differ from Kendler (1985), Torgersen (1985) and Siever's (1985) findings, indicating that negative symptoms (such as social isolation and inadequate rapport) are more characteristic of biological relatives than are the positive symptoms of STPD (such as

illusions, ideas of reference, and magical thinking), as the results of the current investigation demonstrate that the symptom expression of STPD in first-degree family members may be more diffuse, including both negative and positive feature expression. The findings of the present investigation are thus consistent with Nuecheterlein et al.'s (2002) research, suggesting that schizotypy may be more multidimensional than originally expected in the relatives of individuals with SCZ.

Trends for sex differences were observed only when all participants were grouped by sex, with no distinction between relative or comparison participant. Generally, males tended to report limited close friendships more often than female counterparts. When the samples were examined with an age restriction (siblings versus comparison subject analyses), males also reported more suspiciousness and paranoia in both the conservative and in the inclusive samples. Although the findings of the current investigation did not yield clinically significant STPD sex differences among first-degree family members of a person with SCZ, the results did support prior findings of a higher incidence of STPD traits and symptoms in family members. Therefore, as individuals with SCZ and their FDFM are approached to engage in family interventions, mental health agencies and staff need to be equipped with strategies not only to meet the needs of the person with SCZ, but also to meet the needs of family members who may have traits of STPD.

Genetic Implications

Studies attempting to examine the genetics of SCZ utilizing diagnostic linkages have produced inconsistent findings (for review, refer to Ito & Ouchi, 2003). The present findings suggest that previous approaches may have been limited by

restricting assignment of affected status only to individuals in the pedigree with schizophrenia. The results suggest that inclusion of family members with schizotypal features may broaden the affected category, thereby increasing power to detect genetic linkage.

Treatment Implications

Medication management has been identified as being one of the most effective strategies to assist the schizophrenia ill individual with stabilization, but it is only one component of a multifaceted approach that includes both individual and family therapy. A cognitive behavioral approach to individual therapy for a person affected with SCZ has been shown to manage residual symptoms, increase insight and adherence to treatment regimens, and produce improvement in positive and negative symptoms (Rathod, Kingdon, Weiden, & Turkington, 2008; Turkingdon, Dudley, Warman, & Beck, 2004; Turkington et al., 2006). Key components of this approach included psychoeducation, motivational interviewing, social skills training, cognitive remediation and cognitive behavioral therapy (Lewis, Tarrier, & Drake, 2002; Turkington et al., 2004).

Turkington et al. (2004) proposed that family interventions could act to complement the delivery of individual CBT with a patient affected with schizophrenia (Lewis et al., 2002; Rathod et al., 2008; Turkington et al., 2006). Pilling et al. (2002) conducted a meta-analyses of family interventions of schizophrenia and several broad findings were noted that support the use of adjunct family interventions. Family interventions were found to decrease the chance of relapse, improve patient adherence to treatment, and improve patient adjustment (Pilling et al., 2002). Guidelines on the

management of psychosis (NICE, 2009) clearly stipulated that family interventions should be offered to all those with schizophrenia who are in contact with their families and that all interventions should be offered for a minimum of six months.

Results of the present investigation may serve useful in informing family intervention strategies. Many have asserted that family interventions for individuals living with SCZ should entail psychoeducation, efforts to increase family support networks, crisis intervention education, problem-solving and communication skills training (Berglund et al., 2003; Dixon et al., 2001; Leham et al., 1998; McDonnell et al., 2003). Current results suggested that relatives of individuals with STPD experienced unusual perceptions and odd thinking and speech. Utilizing the family unit to improve overall communication and problem-solving skills would not only benefit the client but also family members who experience these difficulties. In particular, males were found to experience greater affect restriction, subsequently increasing communication, including verbalizing emotional experiences; this may reduce family conflict and tension that can arise from misunderstandings from incomplete communication. Moreover, improved family communication may also serve to increase positive social connections, leading to increased support networks.

The findings of the current study also indicated that siblings of individuals with SCZ tended to experience suspiciousness and anxiety. As a result, treatment providers may choose to work with family members initially, even if only one member is receptive to participating. Often the positive experience of at least one family member engenders trust in other family members, leading to more willingness to engage in treatment by

others who may be guarded. Additionally, family anxiety may stem from concern about the care of the patient in a crisis situation, and mental health providers may assist in allaying fears by educating family about how to manage the situation and about local resources for help.

Furthermore, males in the current study were found to possess fewer close friends, suggesting they may have difficulty in making lasting friendships, which may result from a variety of causes, including anxiety, guardedness, or lack of social skills. The family unit, including males, may benefit from learning some strategies to manage and cope with anxiety experienced in unfamiliar situations, including social situations. As a result of these strategies, patient stabilization and reduction in the experience of family burden is likely, as well as the subsequent reduction in the overall social, familial and financial costs.

Despite these recommendations, research has indicated that 75% of patients have contact with family members and of those, only 31% report that their families had received information, treatment, advice and/or support. In addition, only 8% reported that a family member attended an educational or support program about schizophrenia and treatment (Dixon, 1999). This striking information suggested that families of patients with SCZ do not access family interventions (Dixon, 1999). This deficit is concerning in light of the evidence suggesting that family interventions consistently reduce patient relapse and decreased family-perceived burden (Cuijpers, 1999; Dixon, 1999; Pitschel-Walz et al., 2001) and therefore would result in improvements on economic, social and familial facets of life. These changes would thereby reduce the

need for intensive medical and social care, resulting in contained service costs and economic benefits for society and the mental health field (Falloon et al., 1999; Gruber et al., 2005). Despite resounding empirical evidence supporting the provision of family interventions for psychotic disorders and the existence of clear policies, the updating of clinical practice and the provision of services has been staggeringly slow (Fadden, 2006).

Overcoming Treatment Barriers

Several overarching factors are implicated in the lack of services afforded to families with SCZ, which include recipients of service (both service users and caregivers), clinicians and other staff who deliver services, organizations and systems responsible for service delivery, and mental health authorities (Dixon et al., 2001; Fadden, 2006; Smith & Velleman, 2002). Additionally, as cited by Dixon (1999), the World Schizophrenia Fellowship Strategy Development Group has identified several related barriers including, stigma against mental illness, psychoeducation treatments viewed as not important (although by whom is not clear), conflicts between consumers and caregivers, different models of family interventions, inadequate training of the professional workforce, costs and structural problems in mental health services.

Individual and family level. Drawn from the Meriden West Midlands Family Programme in the United Kingdom, Fadden (2006) offers suggestions for each of the three factors to effect positive change. To empower families to rightfully access family interventions, a two-way supportive relationship between professionals and recipients of services must be developed (Fadden, 2006). Individuals with SCZ and their families may benefit from having a forum to advocate safely for services and have needs met. Fadden

suggests that by developing a group with which family members can connect facilitates communication and allows a forum for families to raise service or treatment issues in a neutral manner without identifiers; this reduces isolation and empowers the family (Fadden, 2006). Additionally, recipients of service can also effect change by way of involvement in training. The participation of persons with SCZ and their family members with mental health providers increases an awareness of professionals who work with this group, and permits collaborative working relationships (Fadden, 2006). These family oriented strategies then may also serve to reduce stigma against mental illness, reduce conflicts between consumers and caregivers, and increase the value of psychoeducation treatments.

In addition to the abovementioned challenges, limited understanding by mental health professionals regarding barriers that stem from varying racial and cultural experiences may also significantly contribute inability to access care. For those who have been victims of racial and/or cultural violence and discrimination, seeking mental healthcare from a professional of the dominant race may be an insurmountable obstacle. Patients and family members who have suffered life experiences due to power differentials may also refrain from seeking out mental health services. Other culturally related barriers include families who strongly believe that all family matters are internal matters and it is unacceptable to seek treatment outside of the family unit; families who seek treatment from spiritual advisors and/or shamans may refrain from seeking additional care, and families in which members do not speak the dominant language may simply struggle to communicate with professionals to even make the first contact.

Training all mental healthcare professionals to be culturally competent is critical in reaching out and helping all families. Mental health providers who strive to facilitate a working environment in which racial and cultural diversity is celebrated and honored may honestly and openly demonstrate to recipients of service that their unique values will be incorporated in their individualized treatment program. Mental health providers who have multilingual staff or translators may assist patients and families, who otherwise would have assumed help was unavailable to them, in all levels of care. Providers that create outreach programs, including free educational seminars and free support groups or social groups may reduce stigma in the local community and offer a path to patients and families to establish the first connection.

Training and supervision level. Fadden (2006) highlights two areas in need of attention in order to effect provider change – training and supervision. Proper education and training about the unique needs of families with psychosis is imperative, and updated training on efficacious treatment strategies may eliminate ineffective strategies currently in use; these include a psychodynamic approach because some families view the offered psychoeducation programs as family-blaming, resulting in terminated or strained collaboration between families and professionals (Dixon, 2000). Graduate education in psychology that highlights efficacious treatment not only of individuals with chronic mental illness, but also of their family members is greatly needed (Millet & Schwebel, 1994). The professional training of most clinicians is insufficient to prepare them to work skillfully with seriously mentally ill individuals and their family members (Lefley, 1990), and few programs have developed specific specialization programs in the

assessment and treatment of serious mental illness (Geczy & Cote, 2002). Lack of student interest and limited faculty expertise may be two notable reasons for the absence of psychoses treatment in core curriculum (Lefley, 1990; Millet & Schwebel, 1994). Nonetheless, the educational objectives of a training curriculum should be adapted to focus on specific attitudes, knowledge, skills and competencies, and experiences as it relates to developing the necessary skills within the domain of treating the seriously mentally ill (Lefley, 1990).

Fadden (2006) highlights several skills, the knowledge and the attitudes essential for effective family work. First, mental health providers should possess understanding and empathic attitudes towards families, as well as an awareness of transference and countertransference issues. Solid communication skills, including reflective listening, in conjunction with an ability to engage all family members equally in session, are fundamental. Fadden (2006) also asserts that therapists must possess a strong ability to manage conflict, understand family systems and development, and have familiarity with evidence-based family work. Mental health professionals must also possess a working knowledge of the biological theories of mental disorders, key components of family interventions, and policies relating to families. Well-developed skills, such as behavioral and cognitive family interventions, self-reflection and utilization of supervision are considered critical in working with these families (Fadden, 2006). Programs should consider modification of their required core curriculum to include, at minimum, one course devoted solely to patient and family advocacy, as well as opportunities for student involvement and potential careers in advocating for patient and family rights. Course

specifics may outline needs of patients and families that are unmet by current mental healthcare policies and practices, such as financial constraints, lack of transportation, and limited availability of funded support groups and/or social networking programs, which consequently influence family burden, relapse rates and increased social costs.

Lefley (1990) also suggests that many of the core curricula for clinicians in training are also applicable to those currently working in the field. Continuing education regarding current research on efficacious treatments for individuals and families is viewed as critical (Lefley, 1990). Trainings for continuing education credits are often offered in the area of ethical and legal practice, but courses outlining patient and family advocacy needs, locally and nationally, should also be strongly urged by treatment agencies. Such courses may serve to increase professional involvement in effecting needed change by keeping staff informed of advocacy opportunities and increase empathy for patient and family daily struggles. Service providers who offer their own trainings or continuing education opportunities within the community are strongly urged to add these topics to their training curricula. Such an approach will model for staff, the commitment of program leadership and senior management in providing efficacious and quality mental health services to their consumers. Training, whether graduate, continuing education, or facility in-services, that draw upon empirically supported treatments for family members of an individual with SCZ will not only better equip professionals in training and those currently working the field, but will also work towards eliminating antiquated strategies and modalities still in use.

Supervision and support are also key areas in which positive change could result in better implementation of family work with individuals affected with SCZ. The development of a network to aid in collaborating with other clinicians or mental health workers implementing family work is believed to be crucial in reducing isolation and encouraging one another to persist in trying, in spite of oppositional adversities (Fadden, 2006). Supervision by managers is crucial, because they are in the position of determining whether or not family work is prioritized on treatment teams, whether or not staff is released for training, and monitoring supervision attendance (Fadden, 2006). Supervision also ensures that mental health workers are supported through the entire process from initial engagement, to intervention, to discharge planning (Smith & Velleman, 2002). Group supervision also provides an opportunity for mental health providers to share skills and resources, as well as to permit colleagues an avenue to contribute possible solutions to difficult problems (Smith & Velleman, 2002). Unfortunately, for some clinicians accessing supervision is problematic due to lack of adequately trained supervisors or of time not granted for attendance (Smith & Velleman, 2002). Therefore, the aforementioned strategies to combat the training and supervisory barriers may serve to not only reduce stigma against mental illness and improve collaboration between clinicians and clients, but also eliminate ineffective models of family interventions, and improve the quality and training of the professional workforce.

Administrator and management level. With regard to the organizational level, change occurring at the management and administrator level may positively impact decision-making regarding the delivery of service, because there is a lack programmatic

leadership within treatment providers (Dixon, 1999). Fadden (2006) calls for the development of solid relationships between senior management and mental health workers in attempting to implement family interventions, because having senior level support may facilitate sufficient change. Change at the board level of an agency may take the form of ratifying family work policies and clearly including family interventions in the organization's plans and priorities (Fadden, 2006). Additionally, a mechanism for monitoring the utilization and delivery of family work is essential; this will therefore encourage clinicians to implement their family interventions training in practice (Fadden, 2006). Through implementing positive changes within the roles or capacities of managers and administrators, structural problems may improve.

Mental health-system level. Barriers to families receiving treatment also occur at the health-system level. Current health care emphasizes short-term, cost saving approaches that lack focus on individual pathology, suggesting that family interventions have yet to be an accepted form of primary treatment (Dixon et al., 2001). Lack of awareness of empirical evidence, rigid adherence to current healthcare structure, and inadequate resources seem key in maintaining present healthcare practices (Dixon et al., 2001). A proposed strategy to overcome this barrier entails mental health organizations taking the initiative to implement family intervention programs under the direction of a skilled psychologist with steps for accountability, monitoring and advocacy that are supported by state and governmental health authorities as well as by insurance payers. Linking multiple entities, therefore, is believed to facilitate appropriate monitoring and incorporation of research into practice. One such strategy for implementing

accountability is the creation of an adult family intervention coordinator within the provider agency who serves as a contact person for interventions, facilitates communication between staff and families, and supervises clinicians, thereby monitoring delivery of family interventions (Dixon et al., 2001).

Treatment barrier summary. In summary, several barriers have been identified as impeding family access to empirically supported treatments. Of all of the abovementioned obstacles, professional training and development potentially holds the greatest possibility to effect change on all levels through increased knowledge as well as advocacy efforts. Updating current graduate psychology curricula to provide basic knowledge of severe and persistent mental illness provides the student with comprehensive education and training with individuals experiencing psychoses; it is believed that this updated curricula will produce a subsequent cascade effect. The more successfully mental health professionals are properly and adequately trained to work skillfully with individuals with psychoses and their family members, the more frequently these clinicians will enter the workforce at all levels of care and effect the necessary change to overcome the current treatment barriers.

Clinical Application

In addition to the abovementioned barriers, mental health workers may also have the added challenge of attempting to engage family members with features of STPD in family interventions with their relative with SCZ, as evidenced by this study's current findings. The following strategies are extrapolated from professional working experience and adapted to apply in a practice-oriented framework, because research has yet to

explore this area. Having a working knowledge that these relatives may be at increased risk of experiencing particular schizotypal features (suspiciousness and paranoia, social anxiety, unusual perceptual experiences, odd thinking and speech, and limited social contacts) can ultimately assist clinicians in devising strategies to approach individual members of a family. Awareness that avoidance may play a key role in family absence from treatment may require the clinician or mental health worker to develop alternative and flexible strategies to involve family members. For instance, upon initial contact, a clinician may provide a welcome letter and informational packet that describes agencies services, including the family oriented services. The packet may also invite families to contact the mental health professional to set up a private/group support or educational meeting to provide the family with more information, answer any questions or assist them in engaging in family interventions. Such appointments may be offered as an in-office visit, a home visit or via phone initially. A clinician's flexibility in offering several ways in which a family can connect, may better serve a variety of personal preferences.

Recognizing that family members potentially have a higher incidence of paranoia and social anxiety, as evidenced by the results of the current study, may prevent mental health workers from becoming frustrated easily and develop a stronger appreciation for working alliance to develop slowly before individuals are willing to engage in treatment. The differentiation of relative versus sibling STPD symptom experience may also be crucial in the clinician's outreach. For instance, knowing that parents may not experience paranoia as frequently as siblings, may highlight the importance for a clinician to develop

a working relationship with a parent first, because the development of a positive alliance in the family treatment of adults with SCZ is critical (Smerud & Rosenfarb, 2008). The positive alliance is so critical that research indicates that when relatives developed a positive alliance with therapists early in family treatment, patients were subsequently less likely to show prodromal symptoms of relapse and be re-hospitalized (Smerud & Rosenfarb, 2008). Similarly, in this former assessment coordinator's experience, the development of family liaison helps to facilitate the development of working relationships with other members of the family. The family liaison may then act as a family guide and resource for the clinician, as he or she navigates the family dynamics and works to build a strong working alliance the family unit.

Once solid working alliance has been developed and the family members agree to participate in treatment, knowledge that the individual may experience some disorganization by way of odd thinking may serve the clinician well, as supported by the findings of the present study. Appointment cards and appointment confirmation calls may aid in increasing family attendance. Ultimately, knowledge of familial incidence for features of STPD may better equip mental health professionals in engaging family members in family interventions, ultimately facilitating restoration of family stability.

Proposed Mental Health Program

Based on the findings of the current study and with knowledge of the barriers facing many patients and families, the following is a proposed program for a health clinic or provider. The overarching objective would be to provide a multifaceted treatment program that strives to offer quality medical and mental healthcare that is culturally

competent, that reduces barriers to accessing treatment, and that lessens the cost of mental illness for families and society. A multidisciplinary, multilingual staff would be necessary, including psychiatrists to manage treatment related to medications; psychologists to provide individual, group and family psychotherapy, as well as ongoing development of clinic programs; social workers to facilitate psychoeducational groups and to assist clients in accessing available resources, such as transportation, housing, and social networking opportunities; religious and spiritual staff to offer adjunctive faith-based services, as requested by patient and/or family, and family and/or patient volunteers to assist in facilitating educational groups on advocacy, various support groups, and social networking opportunities.

In addition to the mental health component of the program, an in-house medical clinic, staffed by primary care physicians, nurses and support staff would be available to patients and family at a reduced fee. This joint working relationship between mental health and medical providers would serve to reinforce continuity of care between both providers. Additionally, patient and family burden would be reduced by minimizing unnecessary travel to multiple locations, and limit family out of pocket costs, as well as increasing access to treatment for those who do not speak English; it would also meet the unique needs of each patient and family by offering a multitude of services.

The variety of services offered would include not only outpatient individual, group and family psychotherapy, but also include psychoeducation groups. Additional services offered to individuals with mental healthcare needs and family members include patient and family recovery speakers, various support groups, advocacy opportunities,

and programs to assist with basic financial management, future care planning, vocational/volunteer trainings. Events to build support networks and practice newly learned social skills will also be available.

Attention to the unique needs of patients and families would be an ongoing evaluative process for the clinic. For instance, a shuttle service for those lacking in transportation or those with limited financial means would be offered, as well as home visits for mental health services and evening hours to accommodate client needs. Clients with young children, not considered appropriate for active involvement in treatment, may struggle with finding care for the children; this may limit a key family figure from participating in treatment. These clients, however, will have access to a monitored playroom for young children in order to allow the family to engage fully in treatment. Furthermore, in an effort to reduce stigma, to reach those who may be isolated, and to offer free psychoeducational opportunities, the clinic would regularly engage in outreach in locations such as places of worship, shelters, and assisted care facilities. Last, all of these services would be insufficient without offering a 24-hour on-call crisis line to active patients, which would address both life threatening medical and mental health issues.

This proposed mental health program for treatment providers stresses comprehensive care, with an emphasis on cultural competence and with meeting the unique needs of families and patients. The treatment focuses not only on the individual with significant mental health issues but also on the family unit. Services offered would focus on strategies to reduce relapse and re-hospitalizations, which result from poor treatment compliance and problems with family support. Moreover, the services would

serve to reduce patient and family social isolation, and reduce all forms of family burden, as well as increase meaningful daily activities of patients and increase positive, expressed emotion of family members. Although the cost of such care may require more upfront cost for mental health care providers, patients and families who receive supportive and therapeutic services consistent with the abovementioned objectives would ultimately reduce long term familial, social and economic costs of mental illness.

Study Limitations

Upon reviewing the study methodology, important limitations were identified. Diagnostic interviewers often established first contact with many of the families within the genetic studies at the Brain Behavior Laboratory following the initial phase of recruitment screening, and subsequently worked closely with family scheduling and participation. As a result, interviewers were not blind to participant status, which may have impacted the results indicating that relatives consistently endorsed more STPD items in the SIS interview.

In a related vein, the study procedures included informed consent procedures, phlebotomy, an Axis I diagnostic interview followed by the Structured Interview for Schizotypy, and a family interview for genetic studies; these may require a period from two to six hours for an interview appointment. As a consequence, interviewer fatigue may have contributed to making subthreshold ratings, resulting in skipped items. When global item ratings are rated as subthreshold, interview instructions direct interviewers to skip clarification questions; such clarification questions aid in determining if participant endorsements are clinically significant. In response to potential interviewer error,

questions were excluded if at least 10 or more participants were missing the same question. Of the remaining questions included in the analyses, most were participant responses and not interviewer ratings, suggesting they would be less vulnerable to interviewer judgment. However, it should be noted that the odd thinking and speech, eccentric behaviors, and constricted affect subscales are largely associated with interviewer ratings.

Limitations were encountered in areas of subsequent analyses, as a function of the data collected at the Brain Behavior Laboratory. Specifically, data indicating whether or not siblings reside in the family home with the family member affected with schizophrenia was not available. Subsequent analyses examining potential STPD symptom expression between siblings living with the affected family member and those residing separately could not be conducted.

Last, working with de-identified shelved data posed some inherent challenges and limitations. The fields, from which data was missing, such as a seemingly unanswered question, could not be readily investigated by going back to the original hard copy of the interview. Therefore, determining if the data were truly missing or a data entry error data occurred was not always possible. Additionally, this investigator's personal clinical experience as an assessment coordinator for the Brain Behavior Laboratory's genetic studies could not be fully utilized. Specifically, clinical impressions of family members, family dynamics and family situations could not be drawn upon because no identifiers were used.

Future Research

There are several areas of needed research in need of mention. First, extremely limited research exists examining the disparity between literature calling for family interventions in the stabilization of individuals with SCZ and actual access to treatment. A more comprehensive understanding of the true barriers to family treatment can lead to improved strategies to engage more families, ultimately improving patient stabilization and reduction in relapse rates, leading to lowered social, economic and familial costs.

In addition to further exploring those barriers that exist and why they persist, research is needed to understand more fully the useful strategies in engaging individuals with STPD or features of STPD in family interventions. Most publications discuss the treatment programs for family members of persons with SCZ, but this investigator has not come across a mention or study investigating efficacious strategies actually used to engage families. The potential reciprocal relationship between reducing barriers to treatment and use of strategies to involve families in treatment seems inherently critical.

Once family members of a patient with SCZ are connected with appropriate support services and involved in family CBT treatment, clinicians and psychologists may find that the FDFM may also benefit from individual therapy. Because the incidence of STPD increases among families of a person affected with SCZ, treatment modalities for family members with features of STPD are in need. Little research specifically examining treatment strategies for STPD exists beyond Beck, Freeman and Associates book on cognitive therapy for personality disorders, but none is specifically devoted to meet the unique needs of a FDFM with features of STPD.

Finally, research exploring the racial and cultural impact on STPD symptom prevalence and experience in the general population and also in SCZ families is greatly needed. In addition, the implications race, ethnicity and culture may play in treatment involvement and utilization are areas of needed investigation. A more comprehensive understanding of these issues will enable the mental health community to allow professionals the opportunity to tailor strategies and interventions to better meet the needs of our diverse society.

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Appendix

Throughout the development of the SIS, the instrument has been field-tested at four sites. Versions 1.0 and 1.1 were given to over 1,800 relatives and probands in the Roscommon Family Study, and version 1.4 was given to 34 individuals with schizophrenia and control probands, and their relatives during a pilot follow-up study, occurring in the County of Roscommon (Kendler et al., 1989). Versions 1.3 and 1.4 were given to more than 70 relatives of individuals with schizophrenia and control probands, who were recruited from Hillside Hospital located in New York (Kendler et al., 1989). Version 1.4 was given to 59 unselected twins from the Medical College of Virginia during a population-based twin registry. Version 1.4 was translated into Finnish and Swedish for use in a follow-up investigation of biological and adoptive relatives of individuals with schizophrenia in a large adoption study of schizophrenia in Finland (Kendler et al., 1989)

Version 1.4 contains five types of items. The respondents are asked to choose from a list of potential responses in closed-option items. In field-coded items, the respondent is asked an open-ended question, and based on the response, the interviewer codes one of a number of answers (Kendler et al., 1989). At the end of most symptoms scales, are the global symptoms scores, requiring the interviewer to rate the degree of pathology present in that symptom dimension on a 1 to 7 point scale, ranging from marked to absent. Next, interviewers rate specific signs on a particular category of behavior, such as eye contact, oddness of dress, etc. Global signs are rated by the interviewer on overall performance (Kendler et al., 1989).

Two studies have been conducted with the SIS to determine interrater reliability during different stages of development (Kendler et al., 1989). In 33 joint interviews in West Ireland, the reliability of version 1.0 was tested by two trained blinded assessment raters. Prominent schizotypal features in many of the relatives in the sample demonstrated adequate variance for the accurate reliability assessment in the various scales of the SIS (Kendler et al., 1989). For the seven key global symptom scales, the mean intraclass correlation (ICC) (± SD) was 0.87 ± 0.12; however, only magical thinking had a value below 0.75. During the reliability evaluation of version 1.0, only four key signs of Schizotypy were examined (Kendler et al., 1989). They included global rapport, global odd speech, global oddness, and global suspiciousness as well as corresponding interviewer sign ratings. The reliability of the sign items were somewhat lower than that of the reliability of the symptoms, with an ICC of 0.69 ± 10; with the exception of guardedness, all signs exceeded an ICC of 0.65 (Kendler et al., 1989)

The second interrater reliability study involved 25 blindly assessed relatives of schizophrenia and matched surgical patients (Kendler et al., 1989). This investigation was conducted at the Hillside Hospital of New York. Three interviewers with their Master's degree and extensive experience with structured psychiatric interviews participated, each taking turns interviewing a patient using the SIS while the other two interviewers observed. Ten of the reliability interviews used the SIS version 1.3, and 15 of the interviews used version 1.4 (Kendler et al., 1989)

The relatives in the small reliability study presented with significant schizotypal symptoms variation, whereas little variation in schizotypal signs were noted (Kendler et

al., 1989). The investigators proposed that the low reliability was a function of population variance, not instrument performance (Kendler et al., 1989). Three types of symptom items were contained within version 1.3 and 1.4: closed-option, field-coded and global scores. The mean ICC was 0.97 ± 0.07 for 18 randomly selected closed-option items. The interrater agreement was in perfect agreement for half of the 18 randomly selected items. The ICC was less than 0.95 for only two items (Kendler et al., 1989).

Of the field-coded items, which interviewers code a response to a single item based on their assessment of the respondents' answers, only four items were obligatory (Kendler et al., 1989). A majority of the items depended on positive responses to earlier items. The four obligatory items were located in the suspiciousness section and had an ICC mean of 0.76 ± 32 (Kendler et al., 1989).

The global symptom scales required the interviewer to integrate respondent responses for all items in a give scale, providing a single "best estimate" assessment of the pathology degree (Kendler et al., 1989). Of the 12 global scales, 11 possessed adequate between subject variance, with an ICC mean of 0.77 ± 0.05 for 10 scales, and an ICC mean of 0.70 on only one scale (Kendler et al., 1989). The only global item which had a between subject variance of 0.99, but an ICC of 0.37 was global impulsivity. The mean ICC for all 12 global scales was 0.74 ± 0.13. However, only three signs had significant between-subject variance, defined by ≥ 1.0 (Kendler et al., 1989).

Kendler et al. (1989) believe that the most useful strategy of validation for the SIS is to compare individual symptoms and signs of non-psychotic relatives of schizophrenia

and control probands. Three small-sample validation studies on various versions of the SIS were conducted (Kendler et al., 1989). The first of the studies examined the validity of version 1.0, using blind face-to-face interviews with 210 relatives of schizophrenia probands and matched control participants from the Roscommon Family Study (Kendler et al., 1989). Following the exclusion of relatives with schizophrenia, symptoms were assessed by the SIS. The symptoms more significantly found to be more in common in relatives of patients with schizophrenia versus control participants were social isolation ($p < 0.01$), sensitivity ($p < 0.05$), ideas of reference ($p < 0.01$), suspiciousness ($p < 0.10$), and magical thinking ($p < 0.05$) (Kendler et al.). The signs, assessed by the SIS 1.0, that were significantly more common among relatives of schizophrenia probands were poor rapport ($p < 0.01$), odd speech ($p < 0.01$), odd behavior ($p < 0.01$), and suspiciousness ($p < 0.01$) (Kendler et al., 1989).

The second validation study was conducted using versions 1.3 and 1.4 with a smaller sample of 60 relatives of individuals with schizophrenia and surgical control probands from Hillside Hospital (Kendler et al., 1989). Once relatives with schizophrenia were eliminated and controls for demographic factors were in place, pathological ratings in the relatives of schizophrenia individuals versus controls were found for three symptoms and two signs: global social anxiety ($p < 0.10$), global magical thinking ($p < 0.05$), global interpersonal sensitivity ($p < 0.10$), fullness of affect ($p < 0.05$), and nonverbal suspiciousness ($p < 0.10$) (Kendler et al., 1989). The two signs that had low reliability in the small interrater reliability study, fullness of affect and nonverbal

suspiciousness, significantly discriminated relatives of schizophrenia patients from matched controls in the larger pilot sample (Kendler et al., 1989).

The third validation study, using the SIS version 1.4, was composed of 24 relatives of individuals with schizophrenia and control probands from the Roscommon Family Study (Kendler et al., 1989). Deviant scores in the relatives versus control participants were noted for childhood social isolation ($p < 0.10$), adult social isolation ($p < 0.10$), global rapport ($p < 0.05$), fullness of affect ($p < 0.05$), appropriateness of affect ($p < 0.01$), and global oddness ($p < 0.01$) (Kendler et al., 1989). Evaluation of the SIS as a method of making schizophrenia spectrum personality diagnoses was justified by only one of the validation studies, which had a large enough sample size (Kendler et al., 1989). Data from a slightly larger pilot phase of the Roscommon Family Study (n=272) were blindly reviewed the SIS by one of the investigators to make DSM-III diagnoses of schizotypal and paranoid personality disorder, with a risk found of 16.1 ± 2.9 and 2.7 ± 1.5 percent, respectively in first degree family members of individuals with schizophrenia and matched control participants (Kendler et al., 1989).

Table 1.

Inclusive Sample Demographics (n = 324)

Participant Group	N	Age		Sex	Education		Maternal Education[a]		Paternal Education[b]		MMSE[c]	
		Mean	SD	M:F	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Relatives	211	43.7	12.7	97:114	13.9	2.7	11.9	3.1	12.3	4.0	27.5	3.2
Parents	77	54.1	6.1	31:46	14.2	3.0	11.0	3.6	10.7	4.0	26.9	4.3
Siblings	125	38.8	11.4	61:64	13.9	2.6	12.4	2.7	13.2	3.8	27.9	2.4
CCS	113	34.4	12.0	49:64	14.5	2.7	13.2	3.1	13.1	3.4	28.1	2.0

Note: [a]n = 187 for relatives and n = 104 for comparison subjects. [b]n = 169 for relatives and n = 100 for comparison subjects. [c]n = 209 for relatives and n = 113 for comparison subjects.

Table 2.

Inclusive Sample Diagnostic Characteristics (n = 324)

Participant Group	Major Depressive Disorder		Bipolar Disorder		Other Disorders		Unaffected	
	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency
Relatives	17.1	36	0.9	2	29.9	63	52.1	110
Parents	20.8	16	0	0	22.1	17	57.1	44
Siblings	14.4	18	1.6	2	35.2	44	48.8	61
CCS	6.2	7	0	0	11.5	13	82.3	93

Table 3.

Inclusive Participant Reaction to Interview Length (n = 324)

Response	Relative		Control	
	Percent	Frequency	Percent	Frequency
1 = Too Long	0.5	1	0	0
2	10.9	23	5.3	6
3 = About Right	84.4	178	92.9	105
4	2.8	6	1.8	2
5 = Too Short	1.4	3	0	0
Total	100	211	100	113

Table 4.

Inclusive Participant Openness to Questions (n = 324)

Response	Relative		Control	
	Percent	Frequency	Percent	Frequency
0 = Very Open	14.7	31	15.9	18
1	10.9	23	9.7	9.7
2	15.2	32	11.5	13
3 = About Average	51.7	109	58.4	66
4	5.7	12	4.4	5
5 = Not Open	1.9	4	0	0
Total	100	211	100	113

Table 5.

Inclusive Participant Understanding of Interview (n = 324)

Response	Relative		Control	
	Percent	Frequency	Percent	Frequency
0 = Excellent	72.5	153	80.5	91
1 = Good	25.1	53	18.6	21
2 = Fair	2.4	5	0	0
3 = Poor	0	0	0.9	1
Total	100	211	100	113

Table 6.

Inclusive Participant Overall Quality of Interview (n = 324)

Response	Relative		Control	
	Percent	Frequency	Percent	Frequency
0 = High Quality	83.4	176	92.9	105
1 = Generally Reliable	15.2	32	6.2	7
2 = Questionable	1.4	3	0.9	1
Total	100	211	100	113

Table 7.

STPD Diagnostic Criteria Categorization

Diagnostic Criteria Subscales	Symptom Type	Total Items n	Excluded Items n	Utilized Items n
Ideas of Reference	Positive	19	4	15
Odd Beliefs/Magical Thinking	Positive	26	1	25
Unusual Perceptual Experiences	Positive	9	0	9
Suspiciousness or Paranoid Ideation	Positive	21	0	21
Inappropriate/Constricted Affect	Negative	16	0	16
Lack of Close Friends	Negative	26	12	14
Odd Thinking and Speech	Disorganized	10	0	10
Odd/Eccentric Behavior	Disorganized	3	0	3
Excessive Social Anxiety	Other	6	0	6
Total		136	17	119

Table 8.

Conservative Sample Demographics (n = 246)

Participant Group	n	Age		Sex	Education		Maternal Education[a]		Paternal Education[b]		MMSE[c]	
		Mean	SD	M:F	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Relatives	156	44.1	12.5	75:81	14.1	2.6	12.1	3.0	12.6	3.8	27.6	3.2
Parents	58	54.3	5.9	25:33	14.5	2.8	11.2	3.3	11.8	3.8	27.0	4.3
Siblings	93	38.8	11.3	46:47	14.0	2.5	12.7	2.7	13.6	3.6	27.9	2.3
CCS	90	35.2	11.8	39:51	14.7	2.7	13.5	3.0	13.3	3.5	28.2	1.8

Note: [a]n = 140 for relatives and n = 82 for comparison subjects. [b]n = 126 for relatives and n = 79 for comparison subjects. [c]n = 155 for relatives and n = 90 for comparison subjects.

Table 9.

Conservative Sample Diagnostic Characteristics (n = 246)

Participant Group	Major Depressive Disorder		Bipolar Disorder		Other Disorders		Unaffected	
	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency
Relatives	15.4	24	1.3	2	29.5	46	53.8	84
Parents	17.2	10	0	0	24.1	14	58.6	34
Siblings	14.0	13	2.2	2	34.4	32	49.5	46
CCS	5.6	5	0	0	12.2	11	82.2	74

Note: Bipolar Disorders include Bipolar I and Bipolar II; Other disorders = other Axis I/ II diagnosis without schizophrenia/schizoaffective, major depressive disorder, or bipolar disorder; Unaffected = unaffected with any disorder.

Table 10.

Results Overview

	Conservative Sample	Inclusive Sample
Relatives v. CCS		
Group Effect	S	S
Sex Differences	Trend	S
Group/ Sex Interaction[a]	NS	NS
SIS Total		
Group Effect	S	S
Sex Differences	NS	NS
Group/ Sex Interaction[a]	NS	NS
Parents		
Sex Differences[b]	Trend	Trend
SIS Total	NS	NS
Siblings v. CCS		
Group Effect	S	S
Sex Differences	S	S
Group/ Sex Interaction[c]	NS	NS
SIS Total		
Group Effect	NS	NS
Sex Differences	NS	NS
Group/ Sex Interaction[c]	NS	NS

Note: S = Statistically Significant Result. NS = Non-Statistically Significant Result. Group/ Sex Interaction[a] = Hypothesis 1. Sex Differences[b] = Hypothesis 2. Group/ Sex Interaction[c] = Hypothesis 3.

Table 11.

Conservative Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Relatives and CCS

SIS Subscales	Relative Males v. Relative Females	Relative Males v. CCS Males	Relative Females v. CCS Males	Relative Males v. CCS Females	Relative Females v. CCS Females	CCS Males v. CCS Females
Ideas of Reference	.20	.33	.13	.25	.02	-.14
Magical Thinking	-.07	.24	.28	.24	.28	-.01
Unusual Perceptual Exp.	.07	.54	.45	.52	.43	-.07
Paranoid Ideation	.29	.38	.06	.58	.23	.21
Lack of Close Friends	.48	.21	-.27	.92	.40	.70
Odd Speech	.04	.53	.46	.55	.48	.01
Constricted Affect	.43	.18	-.28	.16	-.23	0
Odd Behaviors	.01	.29	.28	.14	.13	-.19
Social Anxiety	.06	.24	.16	.63	.47	.38
SIS Total	.29	.48	.15	.73	.37	.31

Table 12.

Conservative Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Parents

SIS Subscales	Relative Males v. Relative Females
Ideas of Reference	-.37
Magical Thinking	.18
Unusual Perceptual Exp.	-.24
Paranoid Ideation	.12
Lack of Close Friends	.03
Odd Speech	-.02
Constricted Affect	.53
Odd Behaviors	0
Social Anxiety	-.32
SIS Total	.03

Table 13.

Conservative Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Siblings and CCS

SIS Subscales	Sibling Males v. Sibling Females	Sibling Males v. CCS Males	Sibling Females v. CCS Males	Sibling Males v. CCS Females	Sibling Females v. CCS Females	CCS Males v. CCS Females
Ideas of Reference	.03	.22	.19	.13	.10	-.14
Magical Thinking	.01	.24	.21	.24	.21	-.01
Unusual Perceptual Exp.	-.07	.43	.43	.40	.42	-.07
Paranoid Ideation	.23	.25	.01	.43	.17	.21
Lack of Close Friends	.32	.12	-.20	.80	.38	.70
Odd Speech	.02	.42	.40	.43	.41	.01
Constricted Affect	.44	.23	-.23	.21	-.20	0
Odd Behaviors	.01	.20	.19	.05	.03	-.19
Social Anxiety	-.05	.09	.12	.46	.43	.38
SIS Total	.21	.36	.13	.59	.35	.31

Table 14.

Inclusive Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Relatives and CCS

SIS Subscales	Relative Males v. Relative Females	Relative Males v. CCS Males	Relative Females v. CCS Males	Relative Males v. CCS Females	Relative Females v. CCS Females	CCS Males v. CCS Females
Ideas of Reference	0	-.11	.15	.09	-.50	-.03
Magical Thinking	.05	.32	.26	.25	-.46	-.09
Unusual Perceptual Exp.	-.07	.38	.37	.38	-1.08	-.03
Paranoid Ideation	.21	.25	.03	.36	-.01	.12
Lack of Close Friends	.34	.17	-.16	.75	-.03	.57
Odd Speech	.03	.44	.39	.49	-1.16	.05
Constricted Affect	.39	.23	-.19	.21	-.91	0
Odd Behaviors	.02	0	-.02	.04	-1.65	.04
Social Anxiety	-.03	.17	.18	.39	-1.23	.25
SIS Total	.21	.36	.13	.59	1.03	.31

Table 15.

Inclusive Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Parents

SIS Subscales	Relative Males v. Relative Females
Ideas of Reference	-.28
Magical Thinking	.09
Unusual Perceptual Exp.	-.22
Paranoid Ideation	-.01
Lack of Close Friends	.06
Odd Speech	-.24
Constricted Affect	.48
Odd Behaviors	0
Social Anxiety	.54
SIS Total	-.06

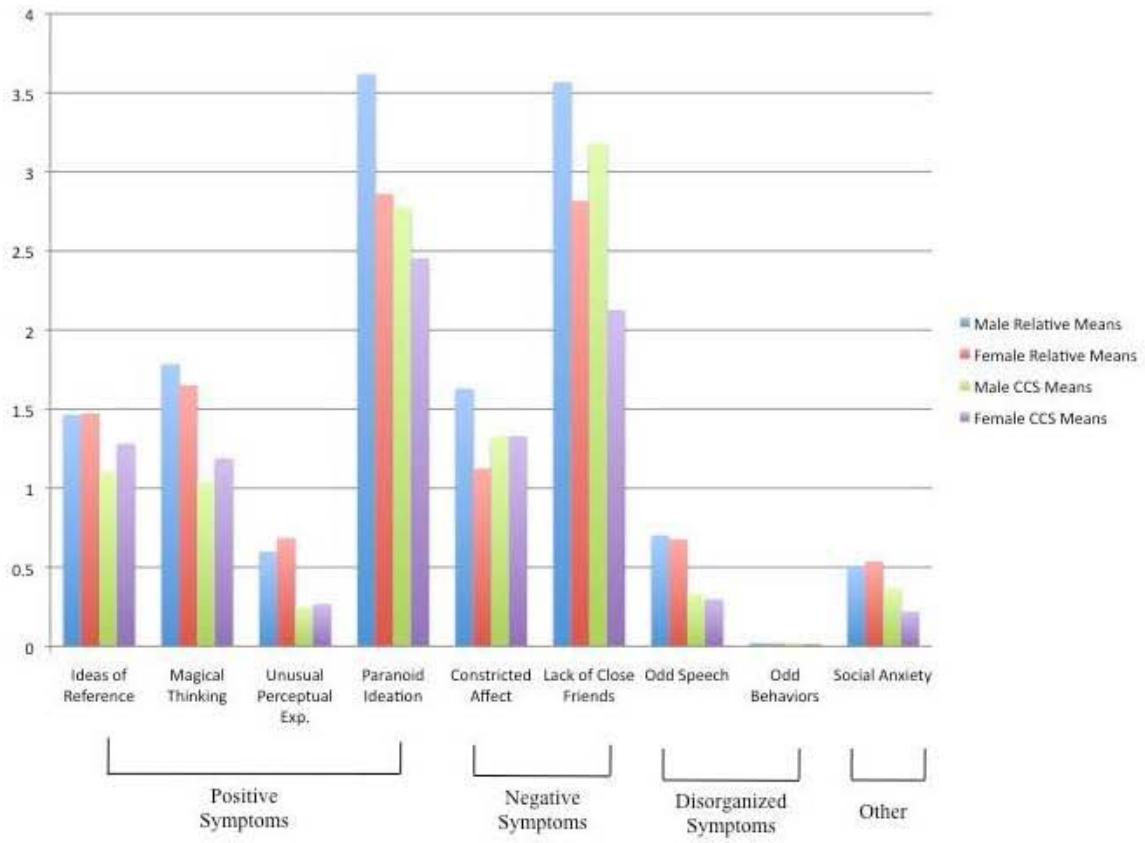
Table 16.

Inclusive Sample SIS Subscales Pairwise Cohen's d Effect Sizes Between Siblings and CCS

SIS Subscales	Sibling Males v. Sibling Females	Sibling Males v. CCS Males	Sibling Females v. CCS Males	Sibling Males v. CCS Females	Sibling Females v. CCS Females	CCS Males v. CCS Females
Ideas of Reference	.16	.28	.10	.20	.02	-.11
Magical Thinking	.04	.37	.29	.28	.21	-.09
Unusual Perceptual Exp.	.08	.48	.34	.48	.34	-.03
Paranoid Ideation	.35	.42	.04	.52	.14	.12
Lack of Close Friends	.50	.26	-.22	.85	.36	.57
Odd Speech	.21	.59	.39	.65	.45	.05
Constricted Affect	.41	.21	-.25	.19	-.22	0
Odd Behaviors	.01	.08	.03	.11	.10	.04
Social Anxiety	.12	.31	.16	.55	.37	.25
SIS Total	.29	.48	.15	.72	.37	.31

Figure Captions

Figure 1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Magical Thinking
Unusual Perceptual Exp.
Paranoid Ideation
Constricted Affect
Lack of Close Friends
Odd Speech
Odd Behaviors
Social Anxiety
Positive Symptoms
Negative Symptoms
Disorganized Symptoms
Other
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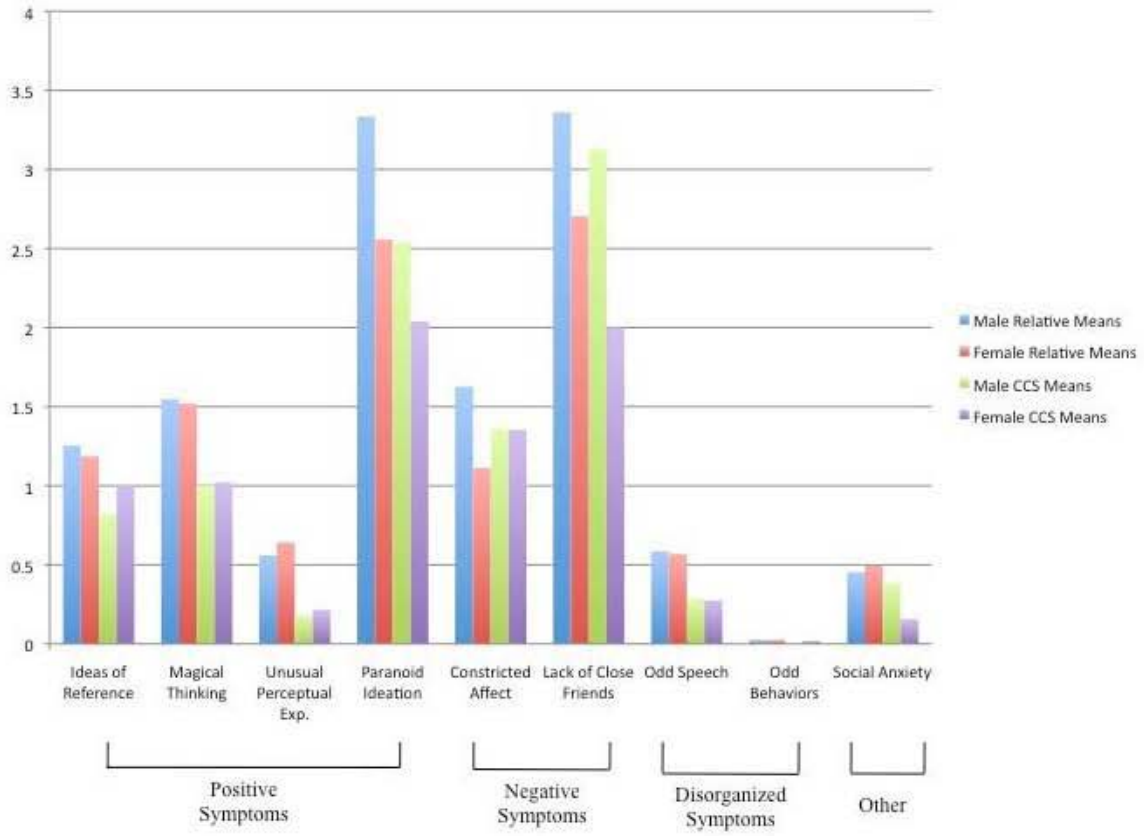
Female Relative Means
Male CCS Means
Female CCS Means

Figure 2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Unusual Perceptual Exp.
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Constricted Affect
Lack of Close Friends
Odd Speech
Odd Behaviors
Social Anxiety
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Negative Symptoms
Disorganized Symptoms
Other
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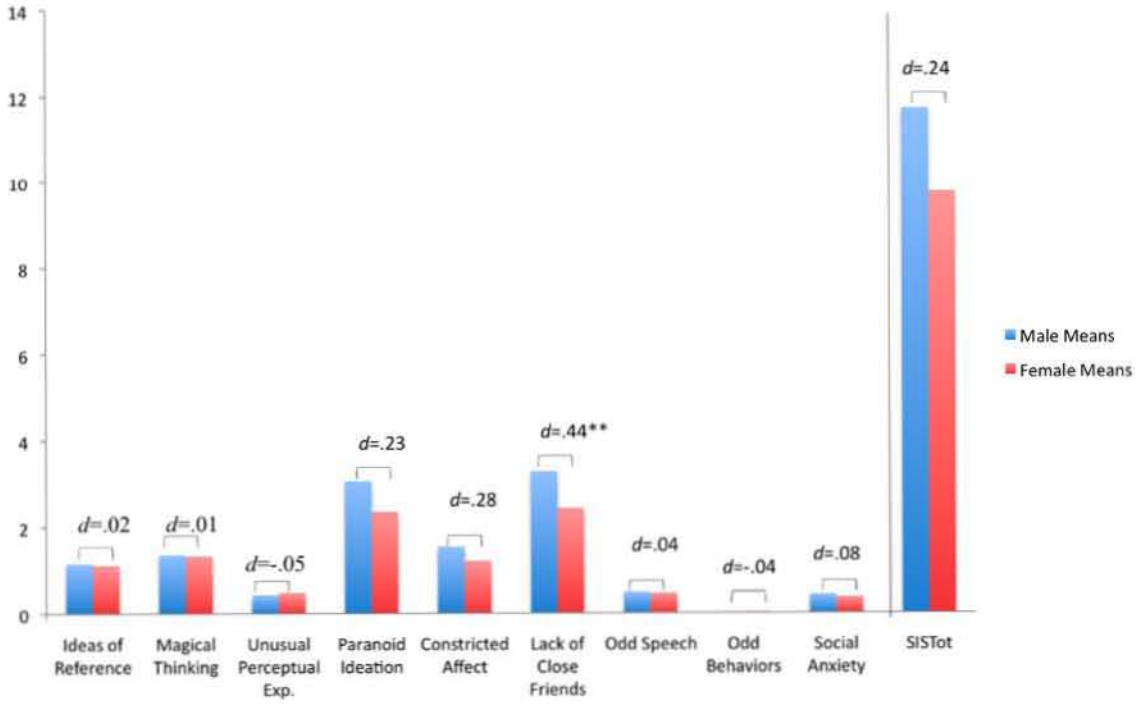
Female Relative Means
Male CCS Means
Female CCS Means

Figure 3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Odd Behaviors
Social Anxiety
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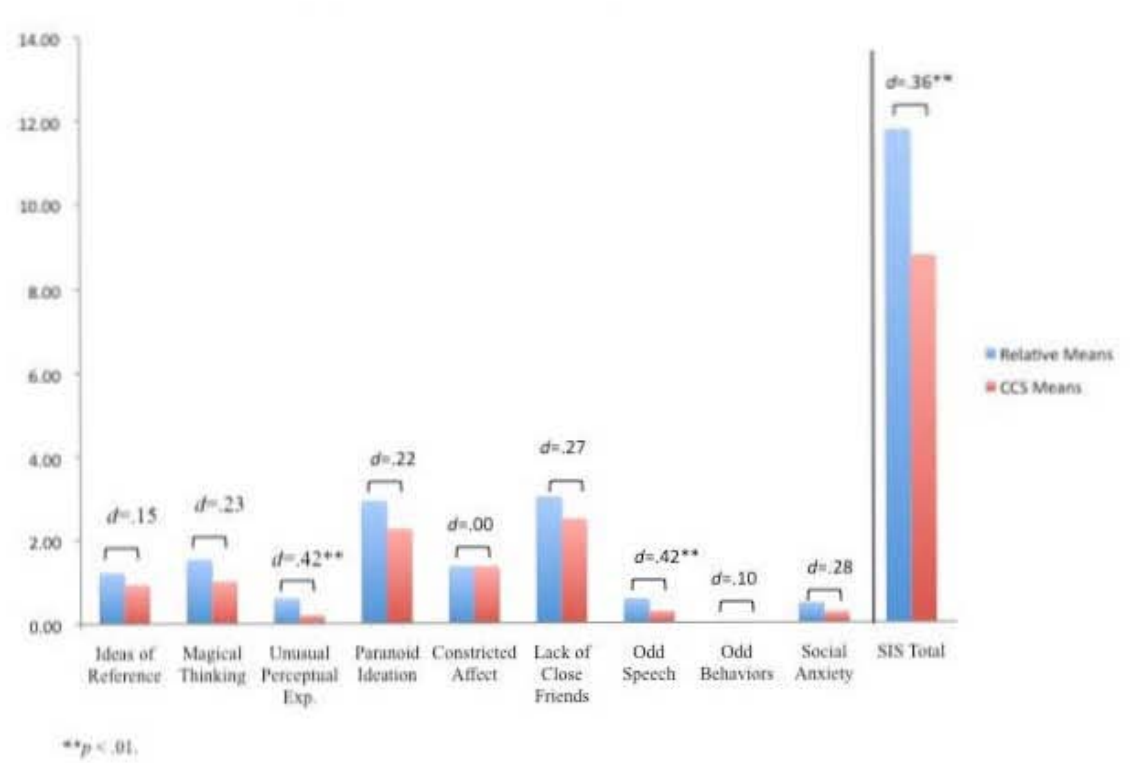
Male Means
Female Means

**$p < .01$.

Figure 4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Ideas of Reference
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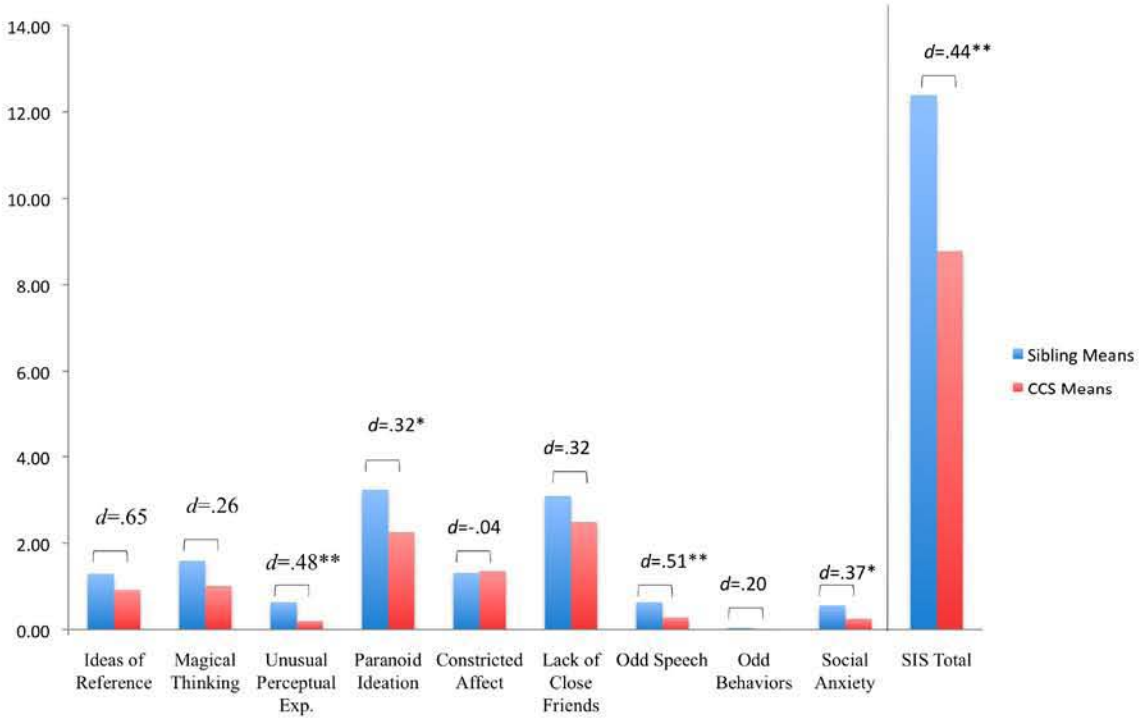
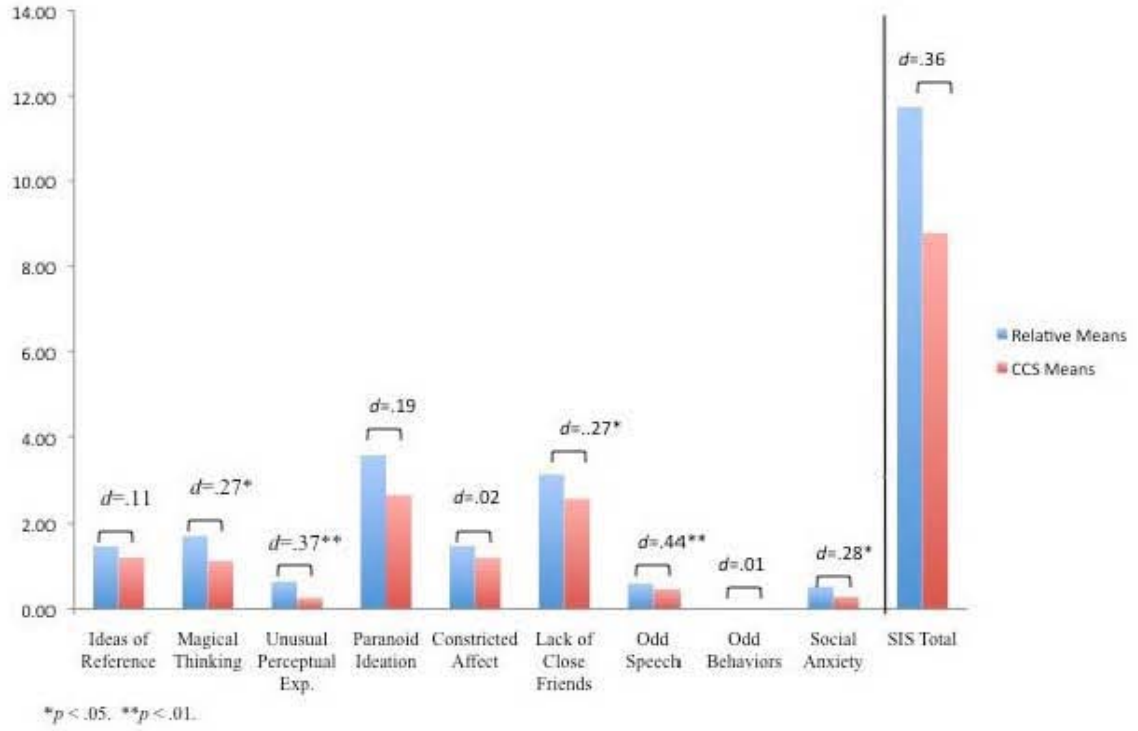
Unusual Perceptual Exp.
Paranoid Ideation
Constricted Affect
Lack of Close Friends
Odd Speech
Odd Behaviors
Social Anxiety
SIS Total
Relative Means
CCS Means
**p < .01.

Figure 5



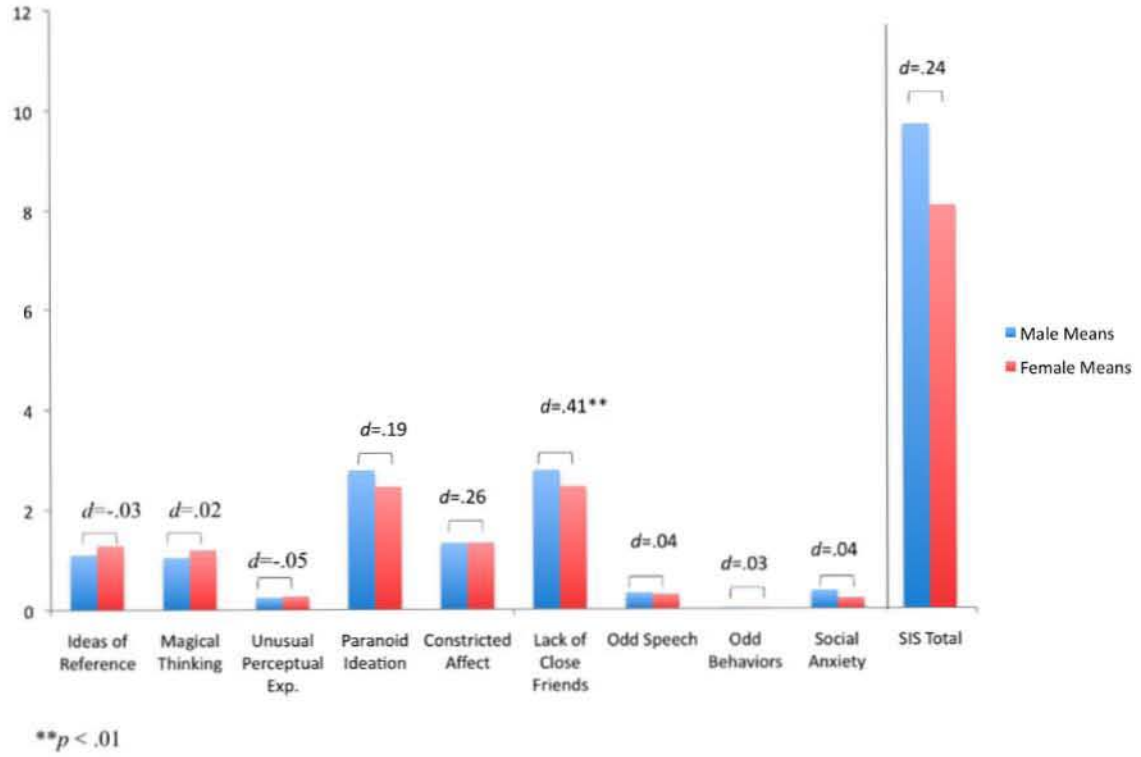
*$p < 05$. **$p < .01$.

Figure 6



*$p < .05$. **$p < .01$.

Figure 7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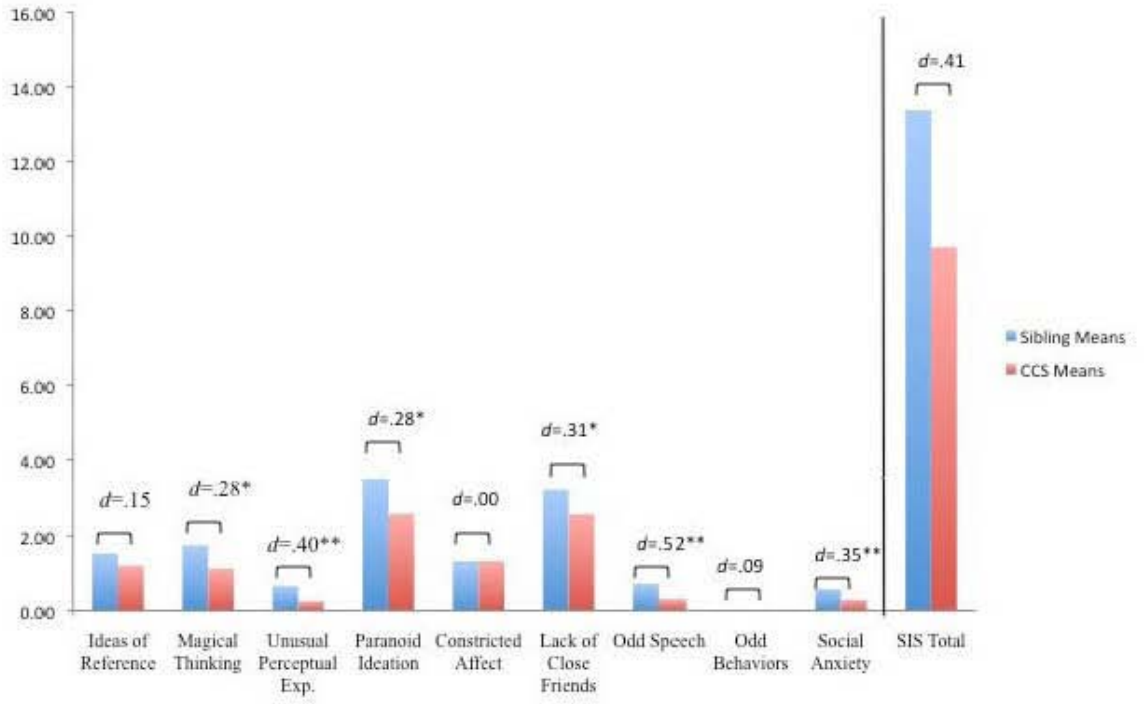
Ideas of Reference
Magical Thinking
Unusual Perceptual Exp.
Paranoid Ideation
Constricted Affect
Lack of Close Friends
Odd Speech
Odd Behaviors
Social Anxiety
SIS Total
Male Means
Female Means

**$p < .01$

Figure 8



*$p<.05$. **$p<.01$.